SERVICE MANUAL

STEREO POWER AMPLIFIER

EXCLUSIVE M3

N

PIONEER®

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1. SPECIFICATIONS

SEMICONDUCTORS

ICs	6
Transistors	86
Diodes and Others	89

AMPLIFIER SECTION

Circuitry	2-stage differential amplifiers. Push-pull predriver. 3-stage Darlington Triple-Push-Pull, pure-complementary OCL circuit.
Continuous Power Output (20Hz to 20kHz, both channels driven)	150W + 150W (8Ω) 180W + 180W (4Ω)
Total Harmonic Distortion	Less than 0.1% (continuous power output) Less than 0.05% (75W + 75W output, 8Ω) Less than 0.05% (1W + 1W output, 8Ω)
Intermodulation Distortion	Less than 0.1% (continuous power output) Less than 0.05% (75W + 75W output, 8Ω) Less than 0.05% (1W + 1W output, 8Ω)
Power Bandwidth (IHF, both channels driven)	5 to 35,000Hz (T.H.D. : 0.1%)
Frequency Response (1W output)	10 to 80,000Hz $^{+0}_{-1}$dB
Input (Sensitivity/Impedance)	INPUT 1, 2 : 1V, 2V/50kΩ
Output	SPEAKER : A, B, C (4 to 16Ω) SPEAKER Level Control : 0 to –20dB (attached to A, B, C terminals)
Damping Factor	More than 35 (20Hz to 20kHz, 8Ω)
Subsonic Filter	8Hz (6dB/oct.)
Signal-to-Noise Ratio (IHF, short-circuited, A network)	More than 100dB

MISCELLANEOUS

Power Requirements	AC 220V, 50Hz /60Hz
Maximum Power Consumption	870W
Dimensions	468 x 206 x 370 mm 18-7/16(W) x 8-1/8(H) x 14-9/16(D)in.
Weight: Without package	27kg 59lb 7oz
With package	31.6kg 69lb 9oz

FURNISHED PARTS

Operating Instructions	1
Technical data sheets	1

NOTE:
Specifications and the design subject to possible modification without notice due to improvements.

2. FRONT PANEL FACILITIES

PROTECTION INDICATOR LAMP
POWER SWITCH

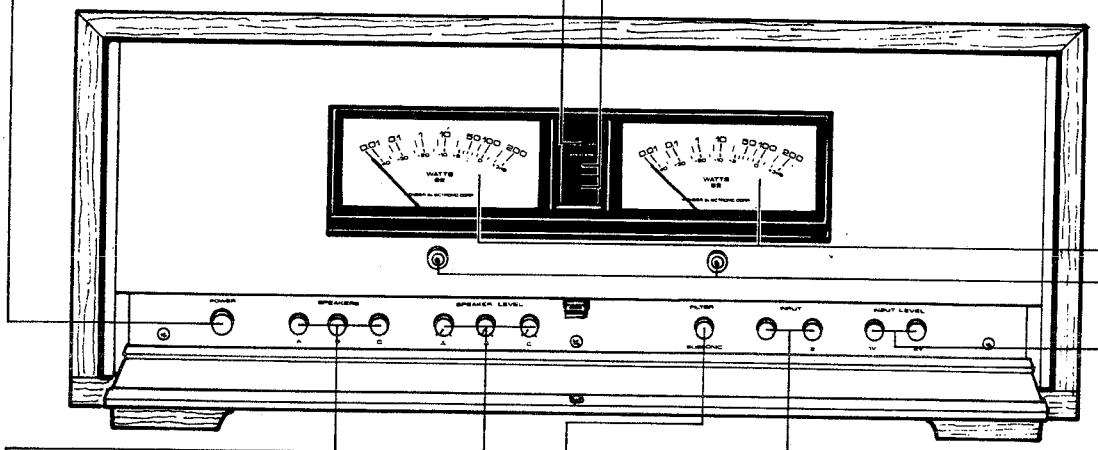
Press in to switch the power ON.
Immediately after you switch the power ON, a protection circuit will be activated. This causes the protection lamp to light and the speakers to remain silent for several seconds. It is NOT due to a malfunction.

NOTE:
If the protection lamp remains lit, this does indicate a malfunction. Consult your Pioneer dealer.

SPEAKERS INDICATOR LAMPS
PEAK POWER METERS

These indicate the output level when 8Ω speakers are connected to the rear panel terminals. They indicate the approximate value of the amplifier's peak output power.

NOTE:
The speaker impedance varies with the frequency of the signal. To determine the actual peak output power, non-inductive 8Ω dummy resistors should be connected instead of speakers.



SPEAKER LEVEL CONTROLS

These give from 0 (maximum volume) to -20dB (minimum volume) control over the speaker output volume. It is useful to adjust them so that different pairs of speakers have the same output volume when you are conducting comparative listening tests with speakers of different sensitivities, switching from one set of speakers to another.

SPEAKER SELECT BUTTONS

To hear the program through the speakers connected to the rear panel terminals A (or B, C), press push-button switch A (or B, C). Only one button should be pressed at any one time.

SUBSONIC FILTER BUTTON

When this is pressed, frequencies below 8Hz will be attenuated by 6dB/oct.
Although the subsonic frequencies affected by this filter are inaudible, they can cause intermodulation distortion and damage the speakers. It is advisable to leave this button IN at all times, even when there is no low frequency noise.

INPUT LEVEL BUTTONS

These match the EXCLUSIVE M3's input sensitivity with the preamplifier's output level.

1V ..... If the preamplifier's rated output is in the range 1V – 2V (or less).
2V ..... If the preamplifier's rated output is 2V or more.

- If the preamplifier's output is more than 2V, clipping distortion will occur. In this case turn down the preamplifier's volume control.
- If the preamplifier's output is below 1V, the EXCLUSIVE M3's full output power will not be obtained. If the preamplifier's rated output is 0.5V, for example, the EXCLUSIVE M3's output will be one quarter of its rated output.

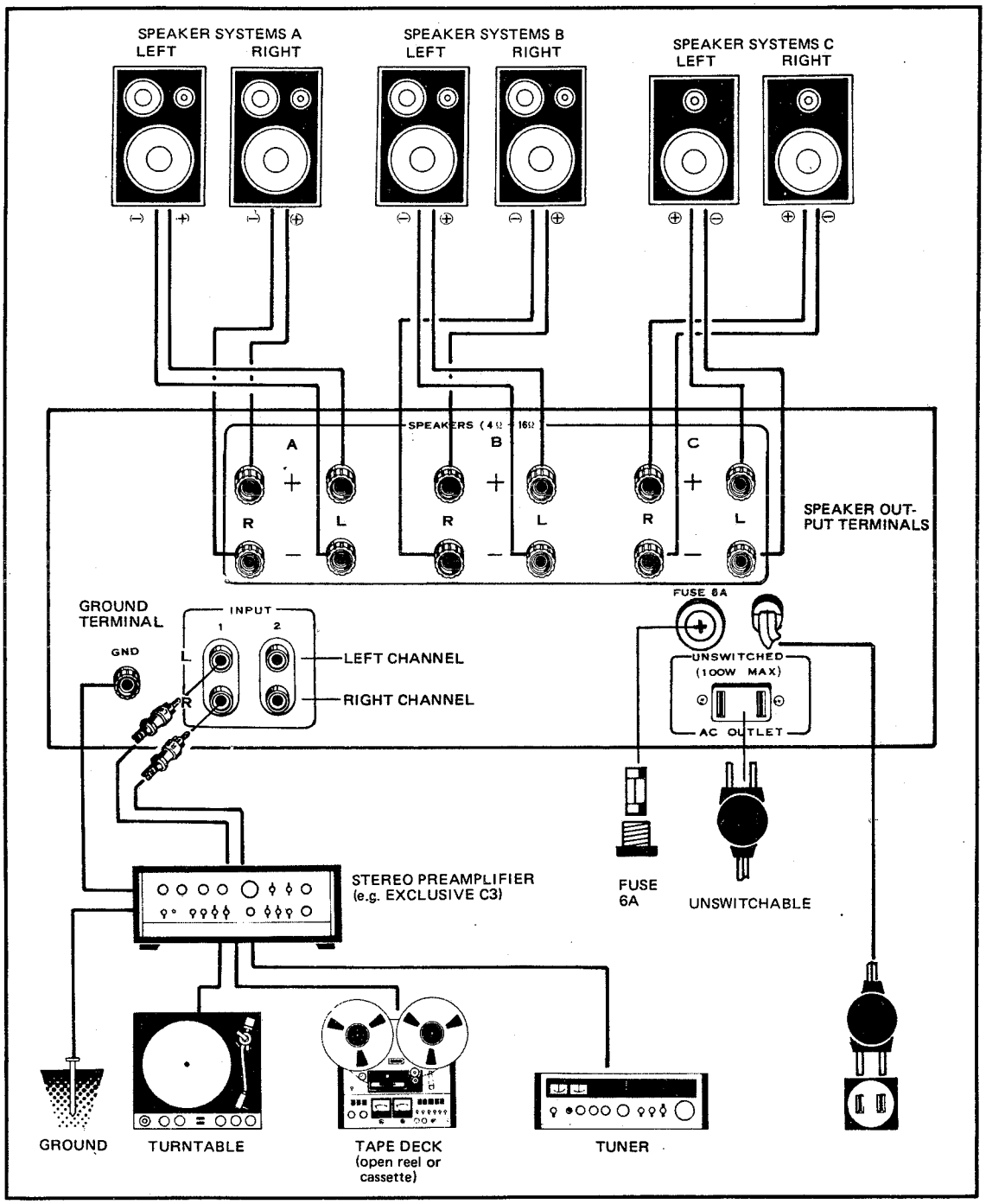
INPUT SELECT BUTTONS

Press the button corresponding to the terminals to which the preamplifier is connected. Be careful only to push in one button.

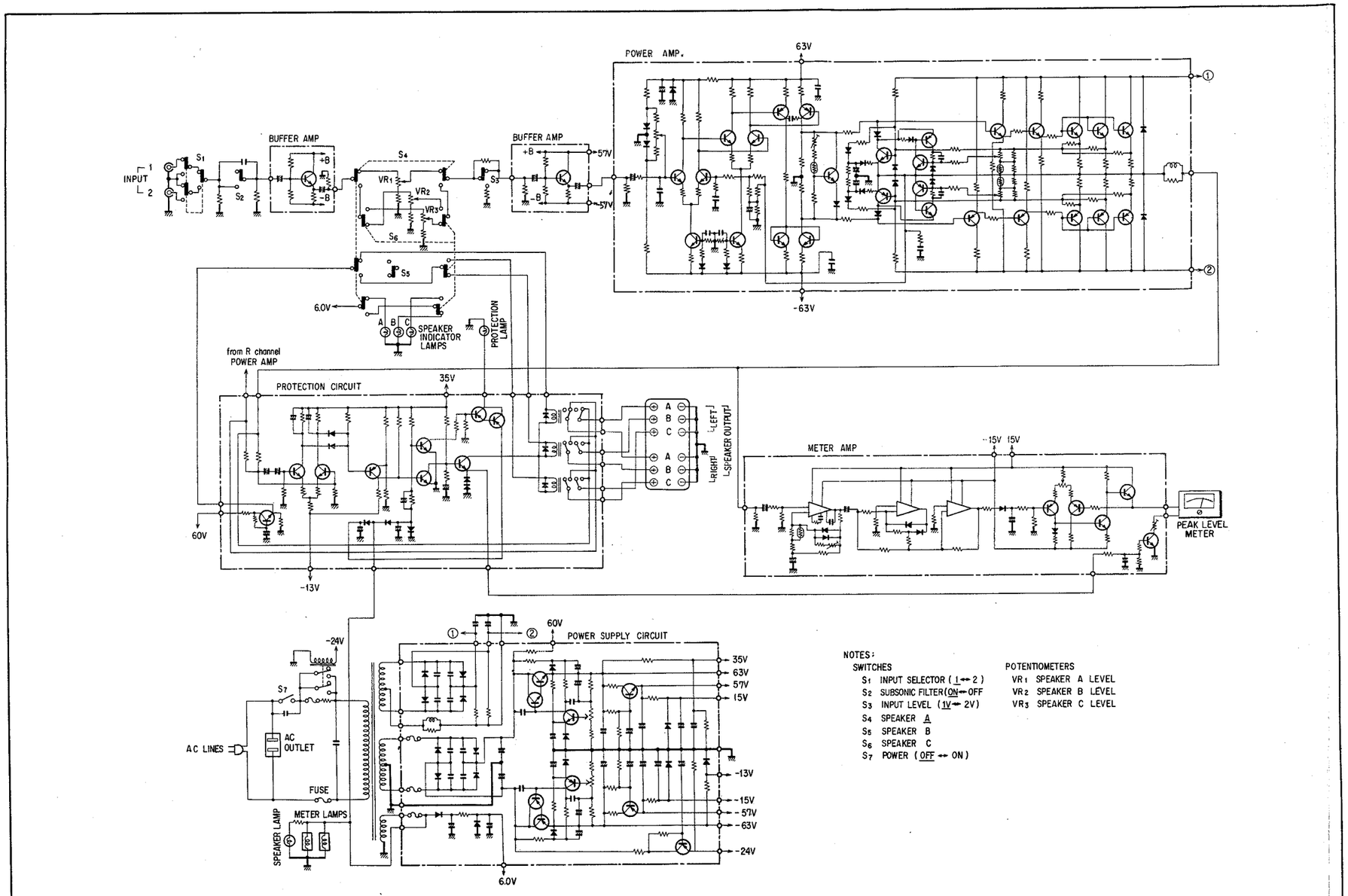
ZERO ADJUSTMENT

When the power is switched OFF, the power meter needles should indicate zero. If they do not, adjust with these screws.

3. CONNECTION DIAGRAM



4. BLOCK DIAGRAM



NOTES:

SWITCHES

- S_1 INPUT SELECTOR (1 ⇔ 2)
- S_2 SUBSONIC FILTER (ON ⇔ OFF)
- S_3 INPUT LEVEL (1V ⇔ 2V)
- S_4 SPEAKER A
- S_5 SPEAKER B
- S_6 SPEAKER C
- S_7 POWER (OFF ⇔ ON)

POTENTIOMETERS

- VR_1 SPEAKER A LEVEL
- VR_2 SPEAKER B LEVEL
- VR_3 SPEAKER C LEVEL

5. CIRCUIT DESCRIPTION

Signal Path

Refer to the block diagram on the previo -us page.

1. Signals fed to the INPUT 1 and 2 terminals are selected by the INPUT switch. From here the signals pass through the SUBSONIC FILTER switch to the buffer amplifier. The input impedance of the buffer amplifier is the load of the subsonic filter which is the previous stage. Because of this the buffer amplifier uses an emitter follower with a high input impedance.
2. The output from the buffer amplifier is fed through the SPEAKER switch, one of the A, B, C LEVEL controls and INPUT LEVEL switch, to a second buffer amplifier.
3. After the buffer amplifier is a differential amplifier which is the first stage of the power amplifier. The output from this differential amplifier is applied to the following stages of the power amplifier.
   The power amplifier is an all-stage direct-coupled pure complementary circuit with two differential amplifier stages. Three power transistors are connected in parallel on each side for push-pull amplification. The power amplifier assembly incorporates an over-current protection circuit and a power limiter circuit which operates when the load impedance is less than 4Ω.
4. Output from the power amplifier goes to the protection circuit relay's contacts to the speaker terminals (A, B or C).
   The protection circuit consists of a circuit for detecting DC drift voltage at the power output junction point, speaker protection relays and the PROTECTION lamp circuit. The detection circuit separates the power output junction point and the speaker terminals immediately DC drift voltage is detected at the junction point. This circuit also acts as a muting circuit when the power is switched ON and interrupts the signal immediately the power is switched OFF.
5. Part of the signal from the power amplifier is fed to the meter amplifier which detects the peak value and causes the peak level meter on the front panel to deflect. This meter amplifier has a logarithmic compression characteristic, giving the meter a range of about 40dB without changing its range.

Power Amplifier

Refer to Fig. 1 for basic circuit.
The chief feature of this circuit is that partial NFB is applied to each stage to obtain optimum gain at the stages. In this way overall NFB is minimized (Fig. 2). If the original characteristics (especially the phase characteristic) are good without NFB, even when the overall NFB is small, the result is an amplifier with excellent characteristics. This means that the characteristics are greatly improved with no deterioration in transient response or stability which would be caused by excessive overall NFB.
The differential amplifier consists of Q_1 and Q_2. The input signal is fed to the base of Q_1 and NFB to the base of Q_2 from the output junction point. Q_3 is the constant current load of the differential amplifier, stabilizing it. The balanced output signals from the collectors of Q_1 and Q_2 are applied to the bases of another differential amplifier consisting of Q_4 and Q_5. After this differential amplifier the signals go to the phase inverter stage consisting of Q_7 — Q_{10}. By connecting its collector to its base, Q_9 is effectively a diode applying temperature compensation to Q_{10}'s base bias. Perfect temperature compensation is possible because Q_9 has the same characteristics as Q_{10}. Output signals from the collectors of Q_8 and Q_{10} are sent to the driver section through a dual Darlington circuit (Q_{18} — Q_{21}) to drive the power transistors for class A amplification. The final stage is a push-pull amplifier with 3 transistors on each side for high output power. Each power transistor has an emitter resistance, preventing abnormal increases in Ic (collector current) caused by transistor instability. Adjustment of idle current is done with VR_2 at Q_{11}'s base. In the M3, the reference value of idle current is about 100mA so as to prevent adverse effects from switching at low signal levels (Fig. 3). When the signal level is high the power transistors operate as a class B amplifier. Because of the low output impedance of the driver transistors when operating as a class A amplifier, transient distortion cannot occur even when the power transistors are off. By arranging the three power transistors in parallel, the current through each transistor can be selected so that hfe is not affected by fluctuations in current and the section of the characteristic curve with large hfe and good linearity can be used.
The offset voltage at the output junction point is adjusted by varying the base voltage of Q_1 with VR_1 (Fig. 3).
The offset adjustment voltage fed to the base of Q_1 is stabilized by Zener diode D_1, so that it is protected from fluctuations in supply voltage and temperature. Further compensation for temperature is done by D_2 and D_3.
Q_{12} — Q_{17} make up an over-current protection circuit which also functions as a power limiter when there is a 4Ω load. It performs both functions by controlling the input signals when they reach their limit.

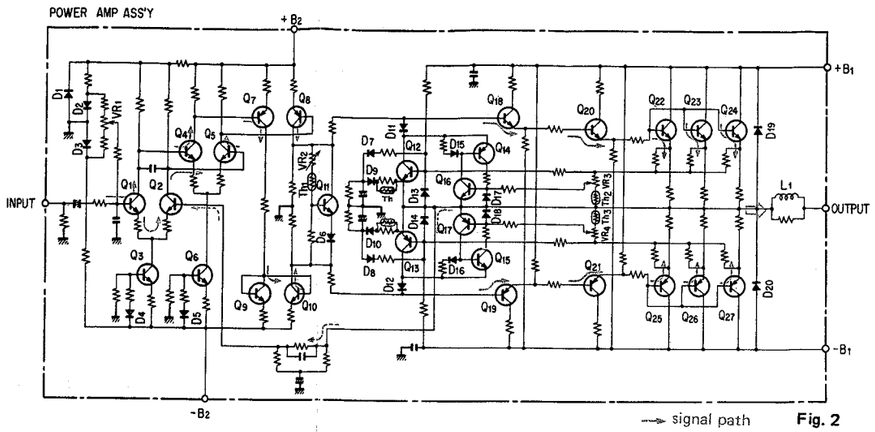


Fig. 2

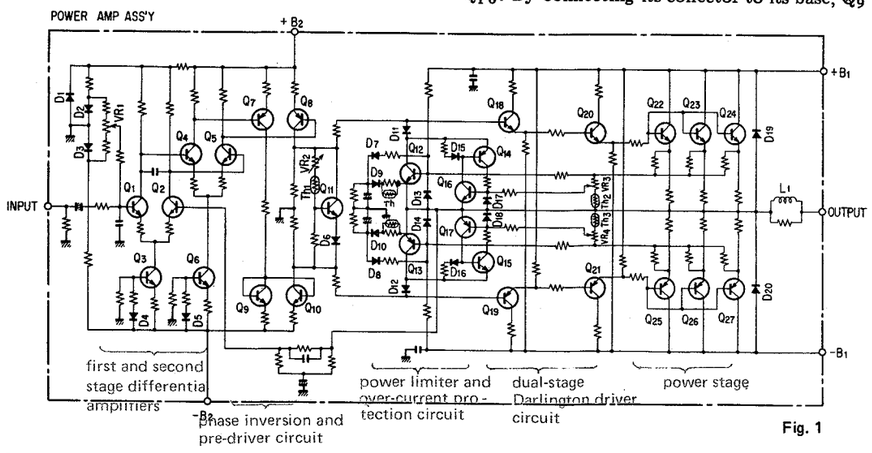


Fig. 1

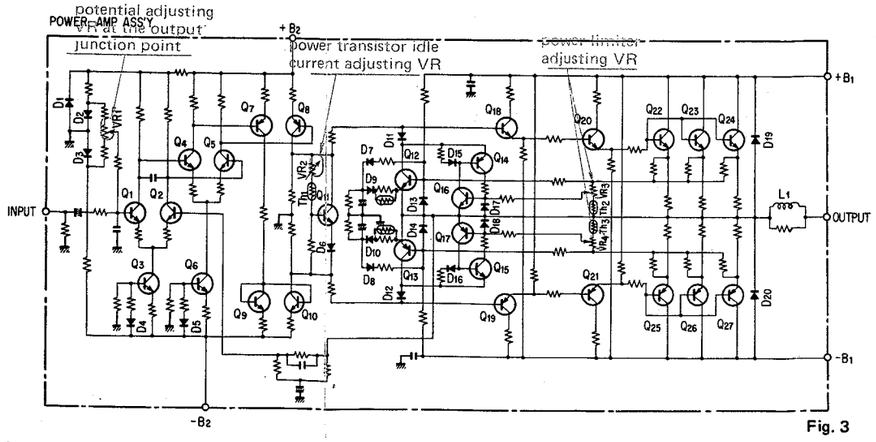


Fig. 3

This circuit operates by detecting the voltage drop in the emitter resistance corresponding to each power transistor and, if it exceeds the set limit, one or more transistors Q_{12} to Q_{17} becomes conducting, thereby reducing the signal voltage applied to Q_{18} and the subsequent transistors. If the load is shorted or an impedance of less than 4Ω is connected, excessive current flows. This is detected and the voltage of the signal applied to Q_{18}, etc. is reduced as just described. In this way the current flowing through the power transistors is controlled. When Q_{12} — Q_{17} are activated by over-current through the power transistors, the PROTECTION lamp does not light, but the sound may be extremely distorted.

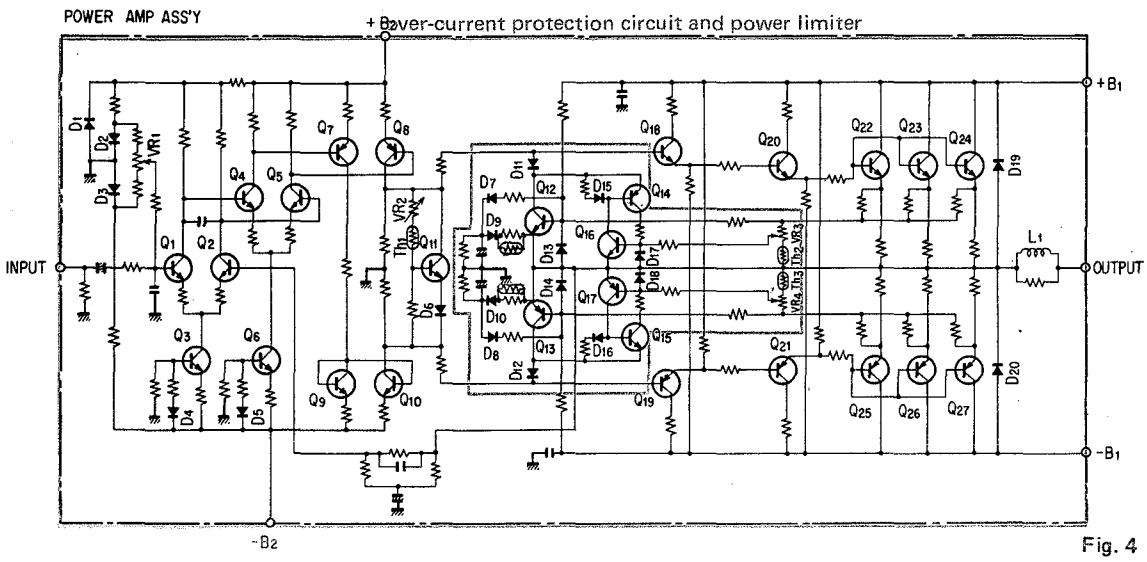


Fig. 4

Meter Amplifier Assembly

The M3 uses peak meters which indicate the peak power of signals. Conventional meters cannot show the signal power in one range because their indication range is only about 20dB.

The meter amplifier circuit consists of a logarithmic compression amplifier, a linear detector, a peak value detection section and a DC amplifier (See Fig. 5). Part of the output signal is logarithmically compressed by an operation amplifier so as to indicate approximately 40dB (0.01W — 200W at 8Ω) in one range.

The linear detector performs full-wave detection on the output signal. The detected DC signal is amplified by the DC amplifier and causes the peak power meter needle to deflect.

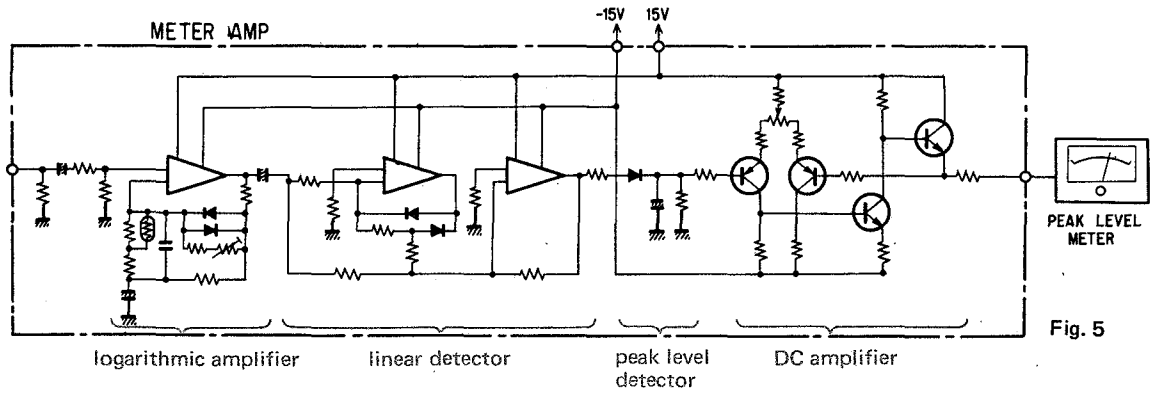


Fig. 5

Protection Circuit Assembly

The protection circuit consists of a junction point DC drift voltage detection circuit, relays and a lamp drive circuit. Figs. 6 — 9 simply illustrate the operation of the protection circuit. Relays A, B and C select the speaker terminals. As they are large capacity relays they cannot be the cause of unstable operation due to poor contact or increases in contact resistance.

1. Immediately after the power switch is set ON

As shown in Fig. 6, transistors Q_1 — Q_6 are turned off immediately the power switch is set ON. Q_7 becomes conducting because it is externally biased.

The PROTECTION lamp lights when Q_7 is conducting and during this period normal operation will not start. Input signals are not fed to the speakers because the power amplifier's junction point is not connected to the speaker terminals.

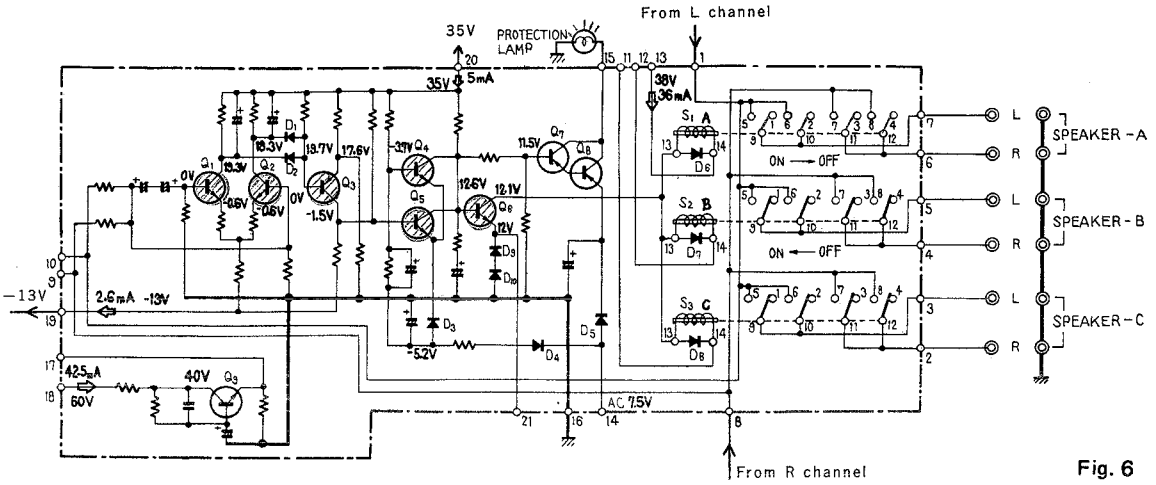


Fig. 6

2. About 10 seconds after the power switch is set ON

About 10 seconds after the power switch is set ON the operation of the amplifier is stabilized. The protection circuit is as shown in Fig. 7 at this time. Transistors Q_1 — Q_5 remain off, but Q_6 is forward biased and turns on because of the charging of the capacitor in its base circuit. This causes current to flow through one of the relay coils A, B or C. This starts normal operation. The PROTECTION lamp goes off because Q_7 and Q_8 are turned off by the base potential of Q_7.

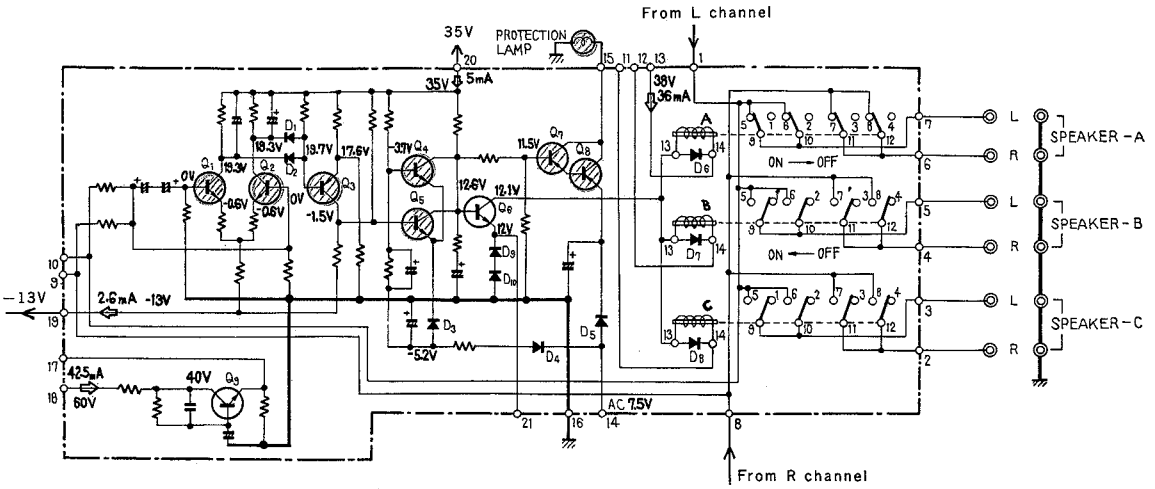


Fig. 7

3. When DC voltage is generated

If DC voltage is generated at the output junction point during normal operation, Q_2 becomes conducting because of the increase in collector current. In this way current flows through D_1 and Q_3 becomes conducting while Q_6 is switched off and Q_7 becomes conducting. With Q_6 cut off, the contact of relay A opens and the speaker is disconnected from the junction point so that the speakers are protected. At the same time the occurance of this DC voltage is indicated by the PROTECTION lamp which is fed power when Q_7 is conducting.

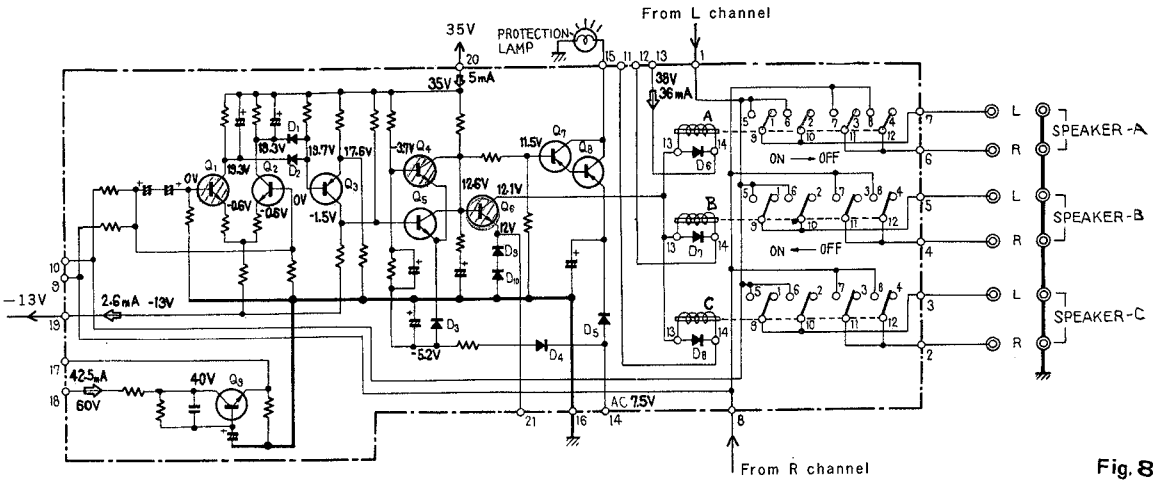


Fig. 8

4. Immediately after the power switch is set OFF

Refer to Fig. 9 for this. Q_4 and Q_7 are switched to conducting by the residual charge from the power circuit electrolytic capacitor. The lamp does not light even though Q_7 becomes conducting because the electrolytic capacitor does not have enough power. When Q_4 becomes conducting, the base voltage of Q_6 drops instantaneously, Q_6 is turned off and relay A contacts separate. At the same time, Q_6 base circuit capacitor discharges more rapidly. Further, the rated amount of muting time is obtained the next time the power switch is set ON.

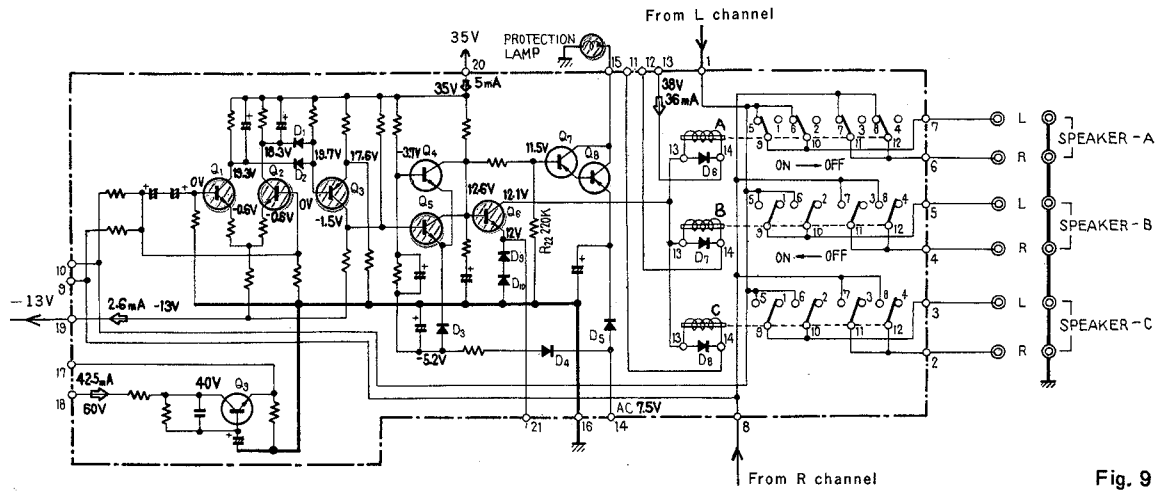
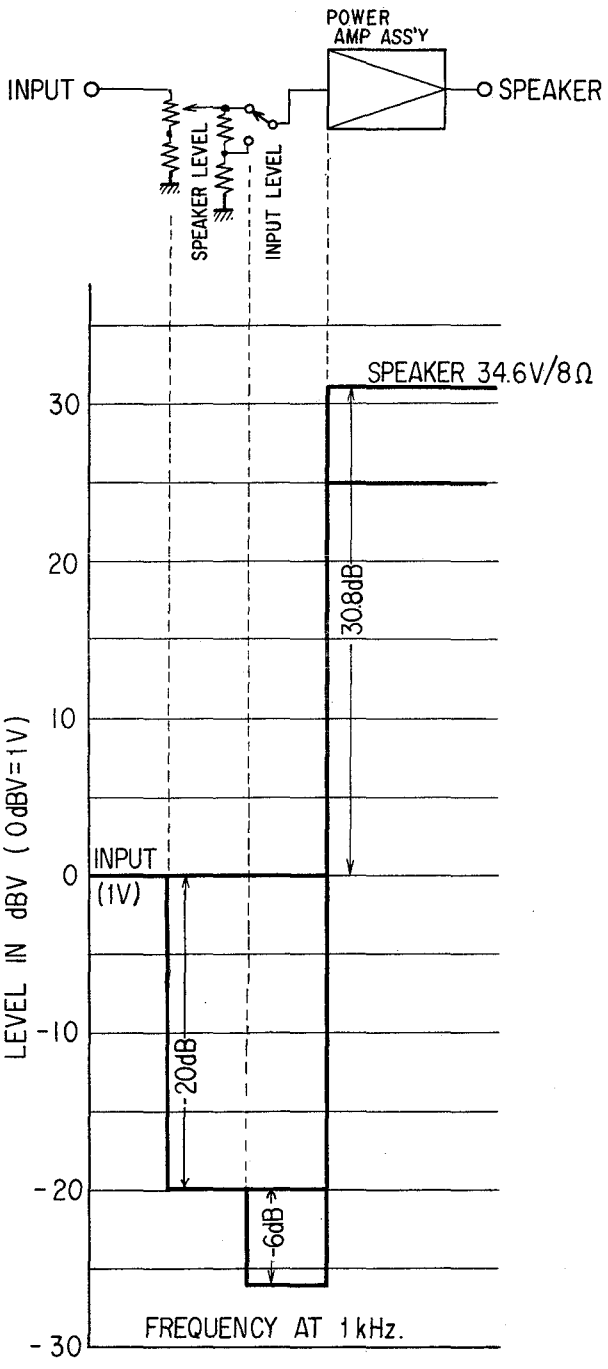


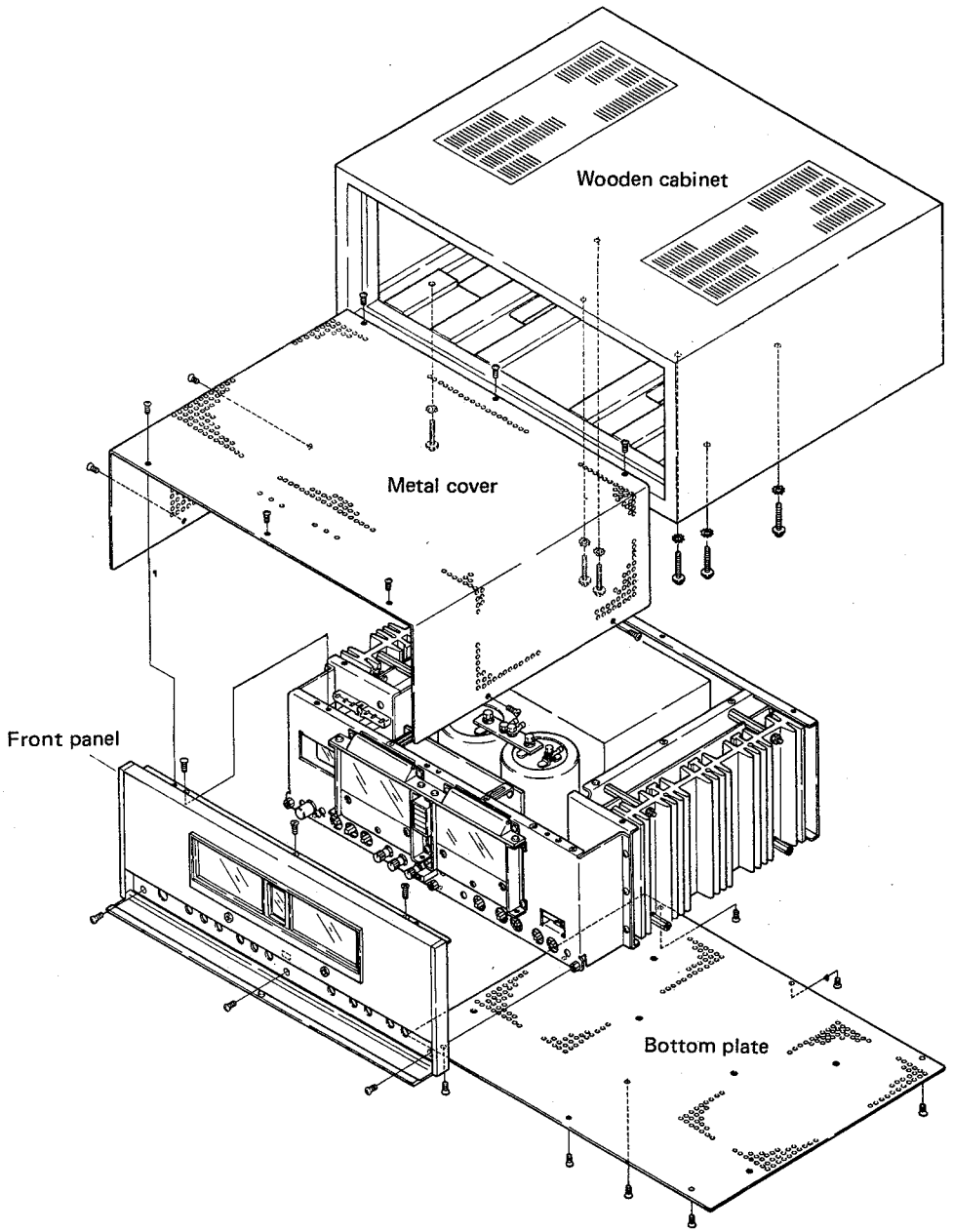
Fig. 9

6. LEVEL DIAGRAM

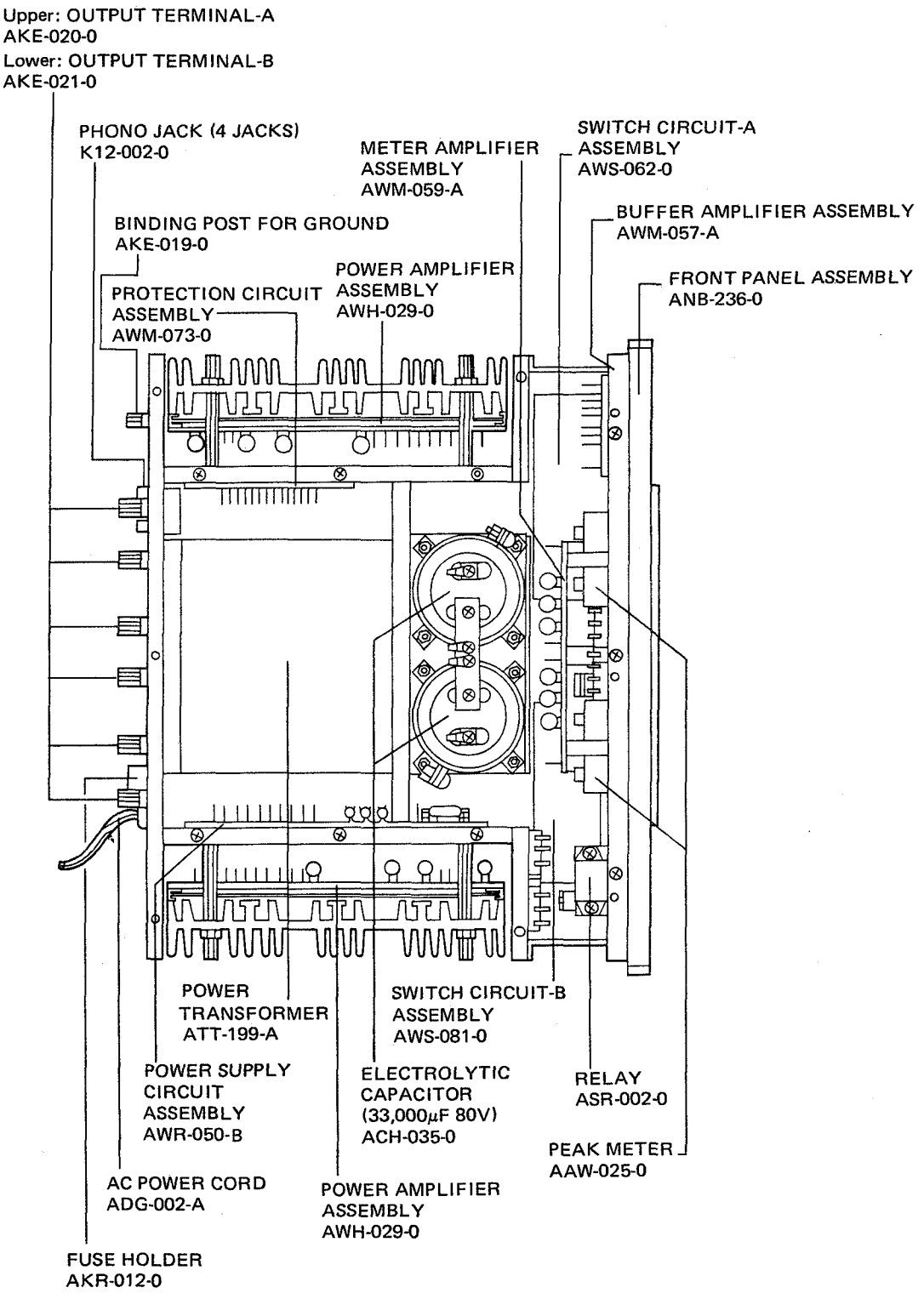


7. DISASSEMBLY

1. Remove the six screws at the bottom of the cabinet and pull out the amplifier.
2. Remove the ten screws to detach the metal cover.
3. Remove the seven screws to detach the bottom plate.
4. Remove the three screws on the top of the front panel and the three screws in the sub-panel and SPEAKER LEVEL control knobs to detach the front panel.



8. PARTS AND P. C. BOARD LOCATION



9. ADJUSTMENTS

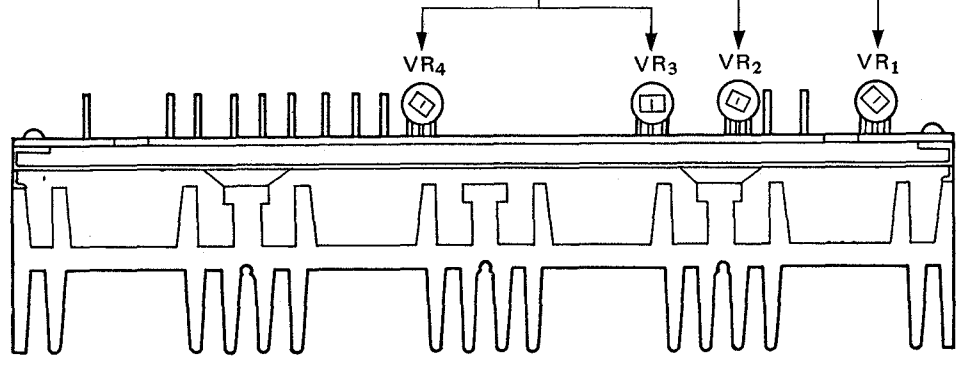
Measuring devices used for this amplifier

1. Audio frequency oscillator
2. DC voltmeter (10mV full scale)
3. AC voltmeter (effective value indication)
4. Oscilloscope (vertical sensitivity ≒ 10mVp-p/cm)
5. 8Ω/4Ω dummy resistors (more than 200W)

Adjustment of the power amplifier

M3's switch positions
INPUT selector switch 1
INPUT LEVEL switch 1V
SPEAKERS switch . . . . . A
Connection of instruments
8Ω/4Ω dummy resistors SPEAKER A terminals
Oscilloscope . . . . . SPEAKER A terminals
The above are connected in parallel.

1. Connect DC voltmeter to the 8Ω dummy resistor.
2. Adjust VR_1 so that the voltmeter indicates OV.
3. Connect the DC voltmeter between terminals 9 and 15.
4. Adjust VR_2 so that the voltmeter indicates 40mV. (Adjust to 25mV 1 — 2 minutes after the power is switched on and to 40mV 30 minutes later.)
5. Connect the audio frequency oscillator (frequency = 1kHz) to INPUT 1 terminals.
6. Connect the AC voltmeter to the 4Ω dummy resistor.
7. Turn VR_3 and VR_4 to positions just before symmetrical distortion of the waveform occurs at the output of 190W (27.6V).



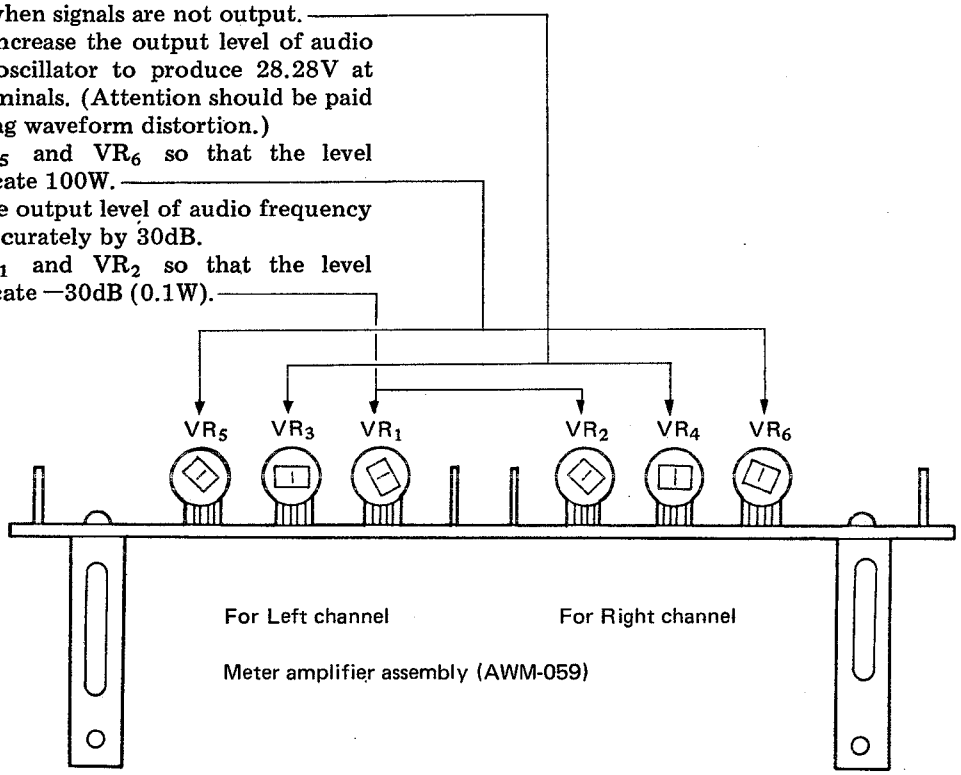
Power amplifier assembly (AWH-029)

* As VR_3 and VR_4 are turned counterclockwise, pulse waves appear at the top of signal wave and distortion rapidly increases. Stop turning just before the point where the pulse wave appears.

Adjustment of Meter Amplifiers

M3's switch positions
INPUT selector switch 1
INPUT LEVEL switch 1V
SPEAKERS switch . . . . . A
Connection of instruments
8Ω dummy resistor . . . SPEAKER A terminals
Audio frequency oscillator . . . . . INPUT 1 terminals (sine wave, 1kHz)
AC voltmenter/Oscilloscope . . . . . SPEAKER A terminals (in parallel)

1. Adjust VR_3 and VR_4 so that the meters indicate 0 when signals are not output.
2. Gradually increase the output level of audio frequency oscillator to produce 28.28V at speaker terminals. (Attention should be paid to not having waveform distortion.)
3. Adjust VR_5 and VR_6 so that the level meters indicate 100W.
4. Decrease the output level of audio frequency oscillator accurately by 30dB.
5. Adjust VR_1 and VR_2 so that the level meters indicate −30dB (0.1W).



Meter amplifier assembly (AWM-059)

10. EXPLODED VIEW AND PARTS LIST

NOTE:
Parts number is subject to change for the purpose of improvement with notice of a service bulletin.
Service bulletin will be furnished whenever necessary and you are requested to amend parts number in this manual according to the instructions.

NOTICE: Any parts asterisked (*) are subject to being not supplied.

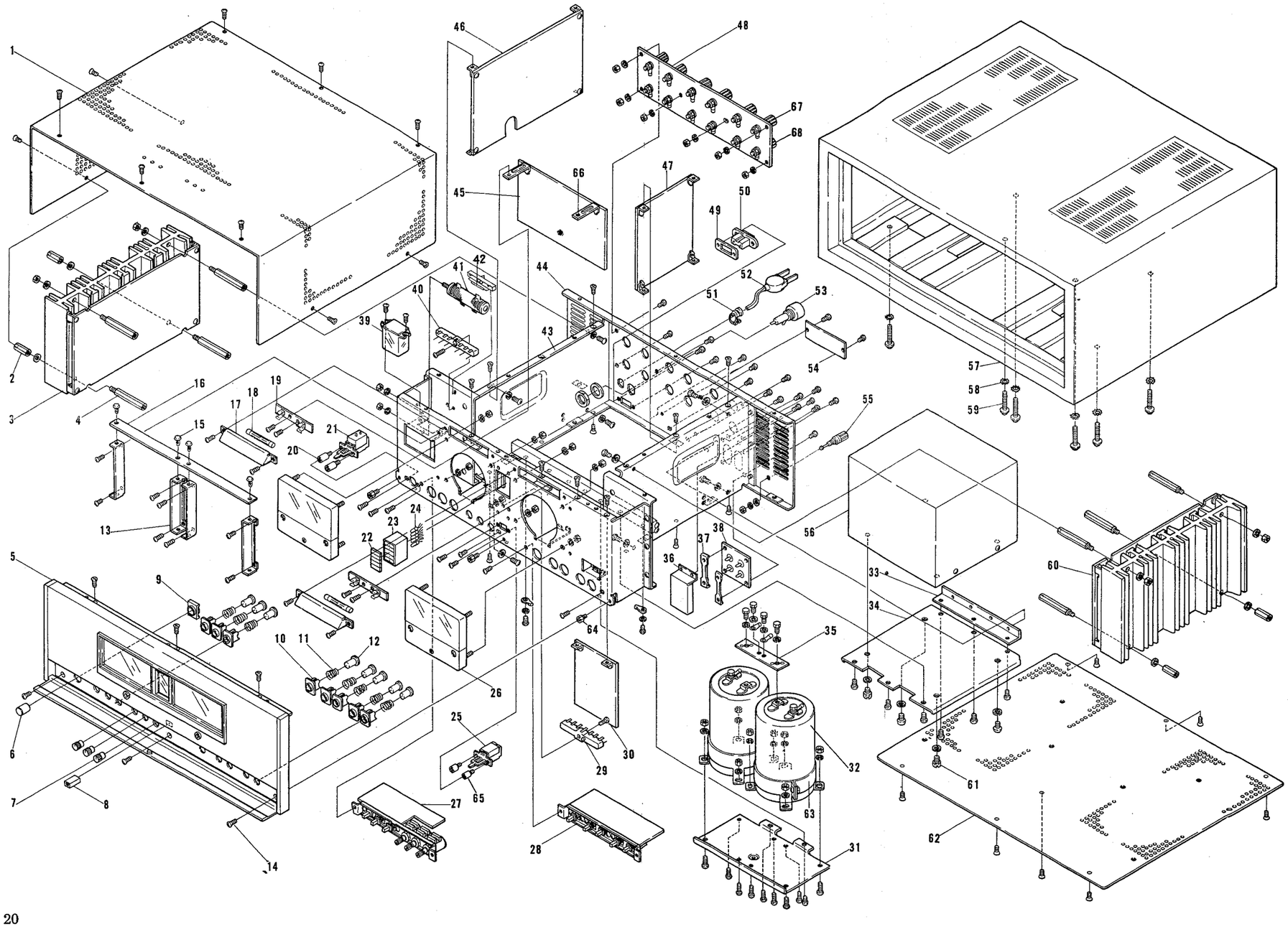
Parts List of Exploded View

Key No.	Description	Parts No.	
1	Metal cover	ANE-047-B	
2	Metal cover supportor	ALA-013-A	
3	Power amplifier assembly	AWH-029-0	
4*	Heat sink-held shaft	ALA-012-0	
5	Front panel assembly	ANB-236-0	
6	Knob (power)	AAD-063-0	
7	Knob (speaker level)	AAB-073-0	
8	Magnet catch	AAE-010-0	
9	Push switch spacer	AEC-149-0	
10	Push knob spacer	AEC-070-0	
11	Spring	AEF-002-B	
12	Knob (speaker, input, filter)	AAD-061-0	
13*	Plastic plate-held metal	ANF-196-0	
14	Screw M3x6 (Ni)		
15*	Clip	AEC-036-A	
16*	Plastic plate	AEC-137-0	
17*	Mirror plate	ANF-200-0	
18	Pilot lamp 8V,0.3A	AEL-020-0	
19	Lamp board assembly	AWX-063-0	
20	Screw (switch holder)	ABA-018-0	
21	Push switch (power)	ASG-077-0	
22*	Plastic plate (small)	AEC-138-0	
23*	Rubber bracket	AEB-048-0	
24	Pilot lamp 8V, 50mA	AEL-014-0	
25	Magnet catch holder	ASX-001-0	
26	Peak meter	AAW-025-0	
27	Switch circuit-B assembly	AWS-081-0	
28	Switch circuit-A assembly	AWS-062-0	
29	Terminal strip (6P)	AKC-022-0	
30	Buffer amplifier assembly	AWM-057-A	
31*	Sub-chassis	ANF-193-A	
32	Electrolytic capacitor 33,000μF 80V	ACH-035-0	
33*	Reinforced metal	ANF-197-0	
34*	Sub-chassis	ANF-194-0	
35*	Plate	ANF-198-0	
36*	Shield cover	ANH-186-0	
37*	Phono jack-held metal	M49-052-A	
38	Phono jack (4 jacks)	K12-002-0	
39	Relay	ASR-002-0	
40	Terminal strip (6P)	AKC-022-0	

NOTICE: Any parts asterisked (*) are subject to being not supplied.

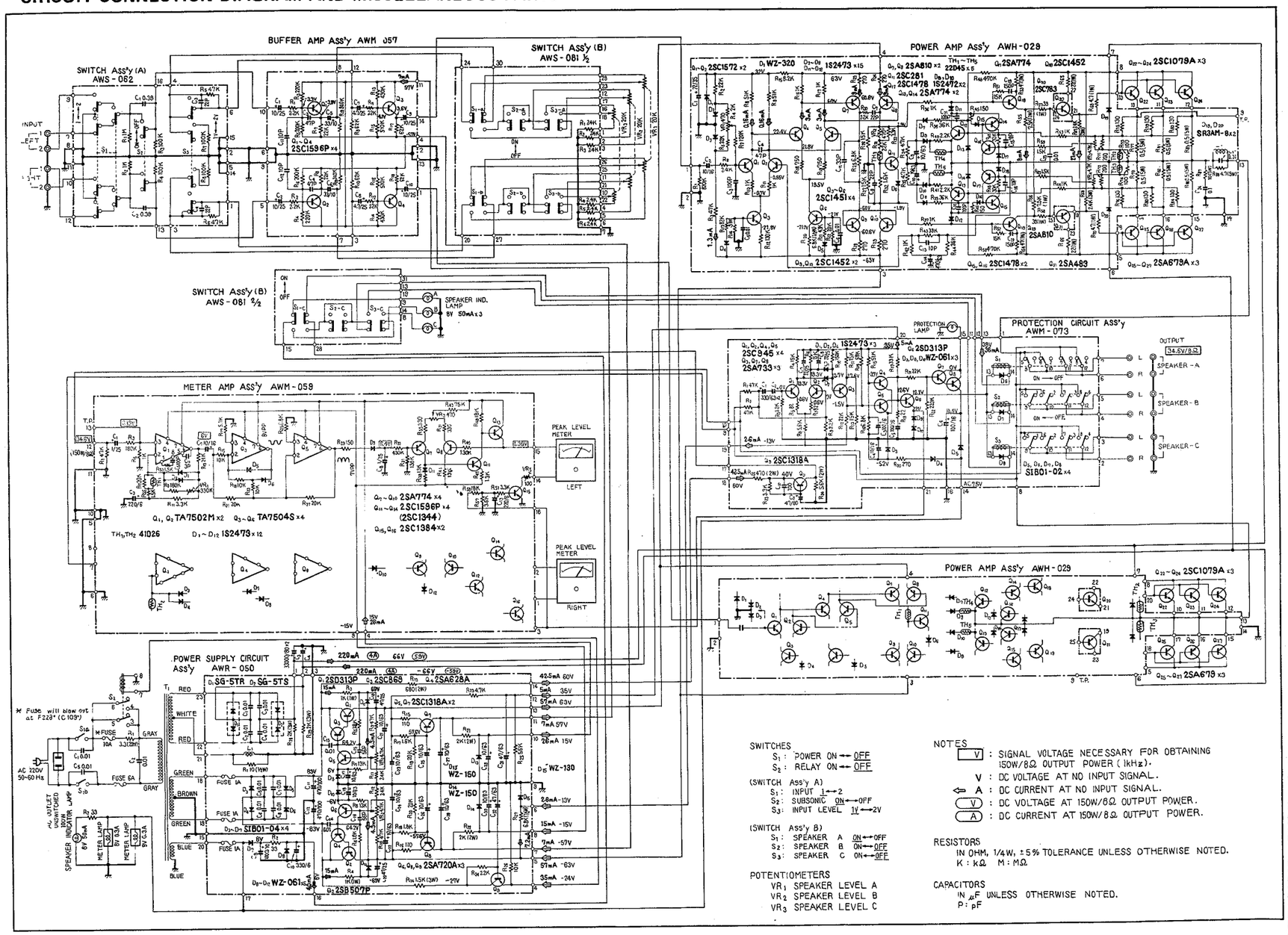
Key No.	Description	Part No.	
41	Wire wound resistor 3.3Ω 20W	ACN-003-0	
42	Thermo-fuse	AEX-001-0	
43	P.C. board-held metal	ANF-192-B	
44*	Rear panel	ANC-098-B	
45	Meter amplifier assembly	AWM-059-A	
46	Power supply circuit assembly	AWR-050-B	
47	Protection circuit assembly	AWM-073-0	
48	Terminal board	AEC-139-0	
49*	AC socket-held metal	ANF-191-0	
50	AC socket	AKP-002-0	
51	AC cord grommet	AEC-079-0	
52	AC power cord	ADG-002-A	
53	Fuse holder	AKR-012-0	
54*	Model name plate	AAL-224-0	
55	Binding post for ground	AKE-019-0	
56	Power transformer	ATT-199-A	
57	Wooden cabinet	AMM-030-A	
58	Washer (4φ)		
59	Screw M4x26	ABA-011-A	
60	Power amplifier assembly	AWH-029-0	
61	Special screw	ABA-017-B	
62*	Bottom plate	ANE-046-A	
63	Electrolytic capacitor holder	ANF-199-0	
64	Special screw	ALA-010-0	
65	Screw (switch holder)	ABA-016-0	
66	P.C. board holder	ANF-190-0	
67	Output terminal (A, red)	AKE-020-0	
68	Output terminal (B, white)	AKE-021-0	

Exploded View



11. SCHEMATIC DIAGRAMS, P.C. BOARD PATTERNS AND PARTS LISTS

11.1 CIRCUIT CONNECTION DIAGRAM AND MISCELLANEOUS PARTS


BUFFER AMP Ass'y AWM-057
SWITCH Ass'y (A) AWS-062
SWITCH Ass'y (B) AWS-081 ½
SWITCH Ass'y (B) AWS-081 ½
SPEAKER IND. LAMP 8V 50mA×3
POWER AMP Ass'y AWH-028
PROTECTION CIRCUIT Ass'y AWM-073
METER AMP Ass'y AWM-059
PEAK LEVEL METER
POWER AMP Ass'y AWH-029
POWER SUPPLY CIRCUIT Ass'y AWR-050
SPEAKER-A
SPEAKER-B
SPEAKER-C
SWITCHES
S1 : POWER ON ↔ OFF
S2 : RELAY ON ↔ OFF
(SWITCH Ass'y A)
S1 : INPUT 1 ↔ 2
S2 : SUBSONIC ON ↔ OFF
S3 : INPUT LEVEL 1V ↔ 2V
(SWITCH Ass'y B)
S1 : SPEAKER A ON ↔ OFF
S2 : SPEAKER B ON ↔ OFF
S3 : SPEAKER C ON ↔ OFF
POTENTIOMETERS
VR1 SPEAKER LEVEL A
VR2 SPEAKER LEVEL B
VR3 SPEAKER LEVEL C
NOTES
V : SIGNAL VOLTAGE NECESSARY FOR OBTAINING 150W/8Ω OUTPUT POWER (1kHz).
V : DC VOLTAGE AT NO INPUT SIGNAL.
A : DC CURRENT AT NO INPUT SIGNAL.
V : DC VOLTAGE AT 150W/8Ω OUTPUT POWER.
A : DC CURRENT AT 150W/8Ω OUTPUT POWER.
RESISTORS
IN OHM, 1/4W, ±5% TOLERANCE UNLESS OTHERWISE NOTED.
K : kΩ M : MΩ
CAPACITORS
IN μF UNLESS OTHERWISE NOTED.
P : pF

• CAPACITORS: IN μF UNLESS OTHERWISE NOTED p: pF
• RESISTORS: INΩ, ¼W UNLESS OTHERWISE NOTED k: kΩ, M: MΩ

Miscellaneous Parts

CAPACITORS

Symbol	Description			Part No.	
C1	Ceramic	0.01	250V	ACG-001-0	
C2	Ceramic	0.01	250V	ACG-001-0	
C3	Electrolytic	33,000	80V	ACH-035-0	
C4	Electrolytic	33,000	80V	ACH-035-0	
C5	Ceramic	0.01	250V	ACG-001-0	

RESISTORS

Symbol	Description			Part No.	
R1	Wire wound	3.3	20W	ACN-003-0	
R2	Carbon film	33		RD¼PS 330J	

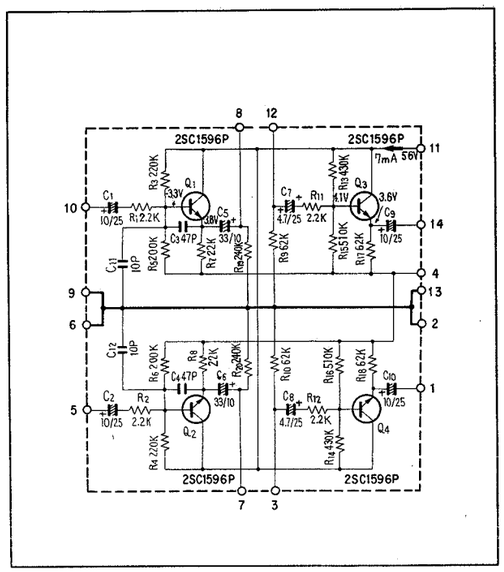
SWITCHES

Symbol	Description	Part No.	
S1	Push switch (power)	ASG-077-0	
S2	Relay	ASR-002-0	

OTHERS

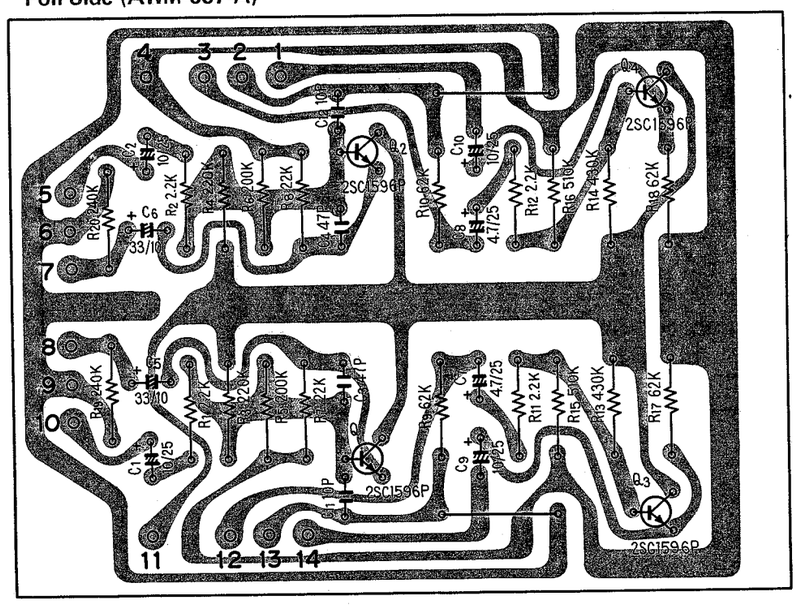
Symbol	Description	Part No.	
	Power amplifier assembly	AWH-029-0	
	Buffer amplifier assembly	AWM-057-A	
	Switch circuit-A assembly	AWS-062-0	
	Switch circuit-B assembly	AWS-081-0	
	Protection circuit assembly	AWM-073-0	
	Meter amplifier assembly	AWM-059-A	
	Power supply circuit assembly	AWR-050-B	
	Lamp board assembly	AWX-063-0	
	Front panel assembly	ANB-236-0	
	Wooden cabinet	AMM-030-A	
	Knob (speaker, input, filter)	AAD-061-0	
	Knob (power)	AAD-063-0	
	Knob (speaker level)	AAB-073-0	
	Magnet catch	AAE-010-0	
	Peak meter	AAW-025-0	
	Phono jack (4jacks)	K12-002-0	
	Output terminal-A	AKE-020-0	
	Output terminal-B	AKE-021-0	
T1	Binding post for ground	AKE-019-0	
	Power transformer	ATT-199-A	
	Pilot lamp 8V, 50mA	AEL-014-0	
	Pilot lamp 8V, 0.3A	AEL-020-A	
	Fuse 1A (protection)	E21-034-A	
	Fuse 6A (AC power)	AEK-109-0	
	Fuse holder (AC power)	AKR-012-0	
	AC socket	AKP-002-0	
	AC power cord	ADG-002-A	
	Operating instructions	ARB-125-A	
	Connection cord	ADE-005-0	
	Packing case	AHD-203-B	
	Inside packing	AHC-010-0	
	Side pad (L) assembly	AHA-050-0	
	Side pad (R) assembly	AHA-051-0	
	Cardboard protector	AHB-019-0	
	Spring	AEF-002-B	
	Push knob spacer	AEC-070-0	
	Thermo-fuse	AEX-001-0	
	Socket cover	AEC-131-0	
	Connector socket	AKF-018-0	

11.2 BUFFER AMPLIFIER ASSEMBLY (AWM-057-A)



2SC1596P

Foil Side (AWM-057-A)



Parts List of Buffer Amplifier Assembly (AWM-057-A)

CAPACITORS

Symbol	Description			Part No.	
C1	Electrolytic	10	25V	CSZA 100M 25	
C2	Electrolytic	10	25V	CSZA 100M 25	
C3	Ceramic	47p	50V	CCDSL 470K 50	
C4	Ceramic	47p	50V	CCDSL 470K 50	
C5	Electrolytic	33	10V	CSZA 330M 10	
C6	Electrolytic	33	10V	CSZA 330M 10	
C7	Electrolytic	4.7	25V	CSZA 4R7M 25	
C8	Electrolytic	4.7	25V	CSZA 4R7M 25	
C9	Electrolytic	10	25V	CSZA 100M 25	
C10	Electrolytic	10	25V	CSZA 100M 25	
C11	Ceramic	10p	50V	CCDSL 100K 50	
C12	Ceramic	10p	50V	CCDSL 100K 50	

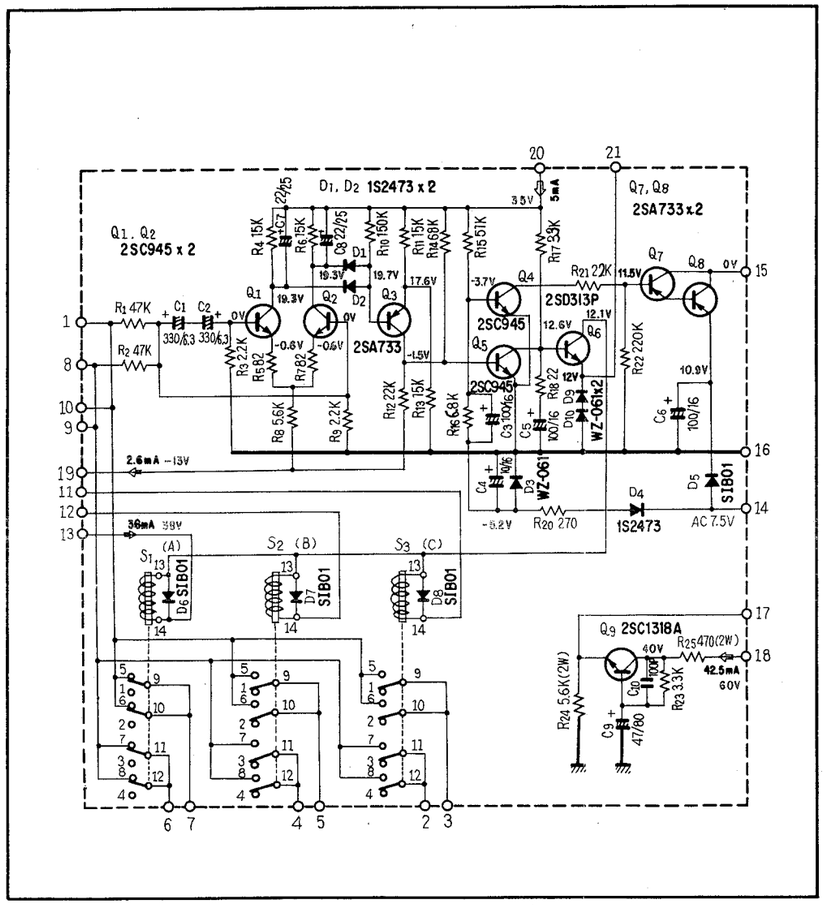
RESISTORS

Symbol	Description		Part No.	
R1	Carbon film	2.2k	RD¼PS 222JNL	
R2	Carbon film	2.2k	RD¼PS 222JNL	
R3	Carbon film	220k	RD¼PS 224JNL	
R4	Carbon film	220k	RD¼PS 224JNL	
R5	Carbon film	200k	RD¼PS 204JNL	
R6	Carbon film	200k	RD¼PS 204JNL	
R7	Carbon film	22k	RD¼PS 223JNL	
R8	Carbon film	22k	RD¼PS 223JNL	
R9	Carbon film	62k	RD¼PS 623JNL	
R10	Carbon film	62k	RD¼PS 623JNL	
R11	Carbon film	2.2k	RD¼PS 222JNL	
R12	Carbon film	2.2k	RD¼PS 222JNL	
R13	Carbon film	430k	RD¼PS 434JNL	
R14	Carbon film	430k	RD¼PS 434JNL	
R15	Carbon film	510k	RD¼PS 514JNL	
R16	Carbon film	510k	RD¼PS 514JNL	
R17	Carbon film	62k	RD¼PS 623JNL	
R18	Carbon film	62k	RD¼PS 623JNL	
R19	Carbon film	240k	RD¼PS 244JNL	
R20	Carbon film	240k	RD¼PS 244JNL	

SEMICONDUCTORS

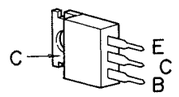
Symbol	Description		Part No.	
Q1	Transistor	2SC1596P-S		
Q2	Transistor	2SC1596P-S		
Q3	Transistor	2SC1596P-S		
Q4	Transistor	2SC1596P-S		

11.3 PROTECTION CIRCUIT ASSEMBLY (AWM-073-0)



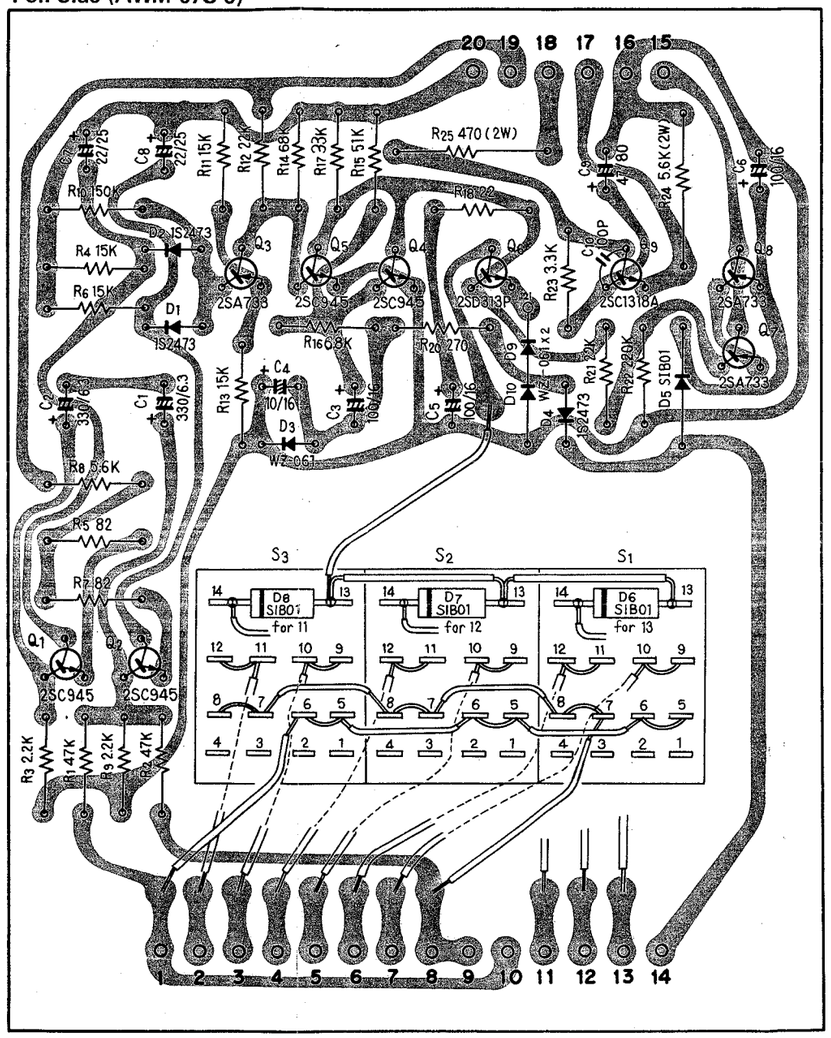
2SC945
2SC1318A

2SD313P



2SA733

Foil Side (AWM-073-0)



Parts List of Protection Circuit Assembly (AWM-073-0)

CAPACITORS

Symbol	Description			Part No.	
C1	Electrolytic	330	6V	CEA 331P 6-85C	
C2	Electrolytic	330	6V	CEA 331P 6-85C	
C3	Electrolytic	100	16V	CEA 101P 16-85C	
C4	Electrolytic	10	16V	CEA 100P 16	
C5	Electrolytic	100	16V	CEA 101P 16-85C	
C6	Electrolytic	100	10V	CEA 101P 16-85C	
C7	Electrolytic	22	25V	CEA 220P 25	
C8	Electrolytic	22	25V	CEA 220P 25	
C9	Electrolytic	47	80V	CEA 470P 80	
C10	Ceramic	100p	50V	CCDSL 101K 50	

RESISTORS

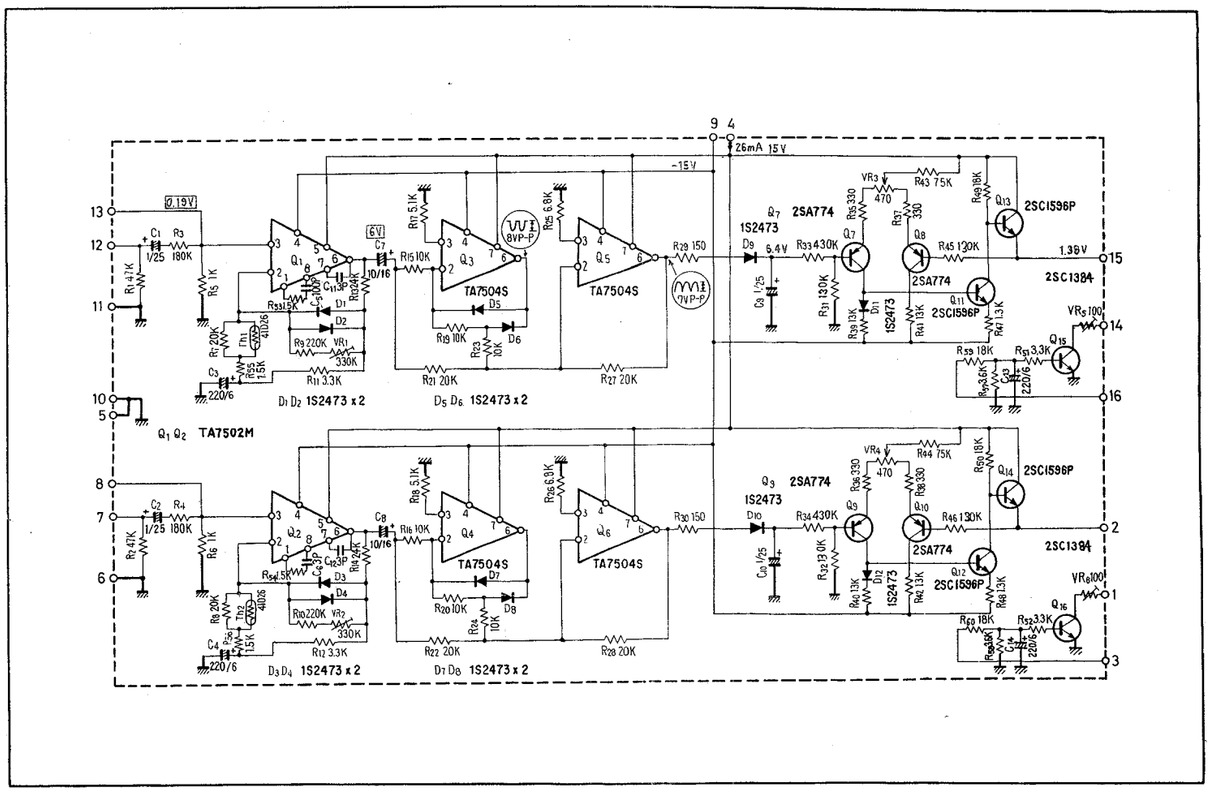
Symbol	Description			Part No.	
R1	Carbon film	47k		RD¼PS 473J	
R2	Carbon film	47k		RD¼PS 473J	
R3	Carbon film	2.2k		RD¼PS 222J	
R4	Carbon film	15k		RD¼PS 153J	
R5	Carbon film	82		RD¼PS 820J	
R6	Carbon film	15k		RD¼PS 153J	
R7	Carbon film	82		RD¼PS 820J	
R8	Carbon film	5.6k		RD¼PS 562J	
R9	Carbon film	2.2k		RD¼PS 222J	
R10	Carbon film	150k		RD¼PS 154J	
R11	Carbon film	15k		RD¼PS 153J	
R12	Carbon film	22k		RD¼PS 223J	
R13	Carbon film	15k		RD¼PS 153J	
R14	Carbon film	68k		RD¼PS 683J	
R15	Carbon film	51k		RD¼PS 513J	
R16	Carbon film	6.8k		RD¼PS 682J	
R17	Carbon film	33k		RD¼PS 333J	
R18	Carbon film	22		RD¼PS 220J	
R19					
R20	Carbon film	270		RD¼PS 271J	
R21	Carbon film	22k		RD¼PS 223J	
R22	Carbon film	220k		RD¼PS 224J	
R23	Carbon film	3.3k		RD¼PS 332J	
R24	Metal oxide	5.6k	2W	RS2PF 562J	
R25	Metal oxide	470	2W	RS2PF 471J	

SEMICONDUCTORS

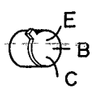
Symbol	Description		Part No.	
Q1	Transistor	2SC945-Q or R		
Q2	Transistor	2SC945-Q or R		
Q3	Transistor	2SA733-Q		
Q4	Transistor	2SC945-Q or R		
Q5	Transistor	2SC945-Q or R		
Q6	Transistor	2SD313P-E		
Q7	Transistor	2SA733-Q		
Q8	Transistor	2SA733-Q		
Q9	Transistor	2SC1318A-R		
D1	Diode	1S2473		
D2	Diode	1S2473		
D3	Zener diode	WZ-061		
D4	Diode	1S2473		
D5	Diode	S1B01-02		
D6	Diode	S1B01-02		
D7	Diode	S1B01-02		
D8	Diode	S1B01-02		
D9	Zener diode	WZ-061		
D10	Zener diode	WZ-061		

SWITCHES

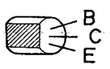
Symbol	Description	Part No.	
S1~3	Relay	ASR-007-0	



2SC1596P

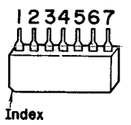


2SC1384

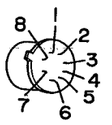


2SA774

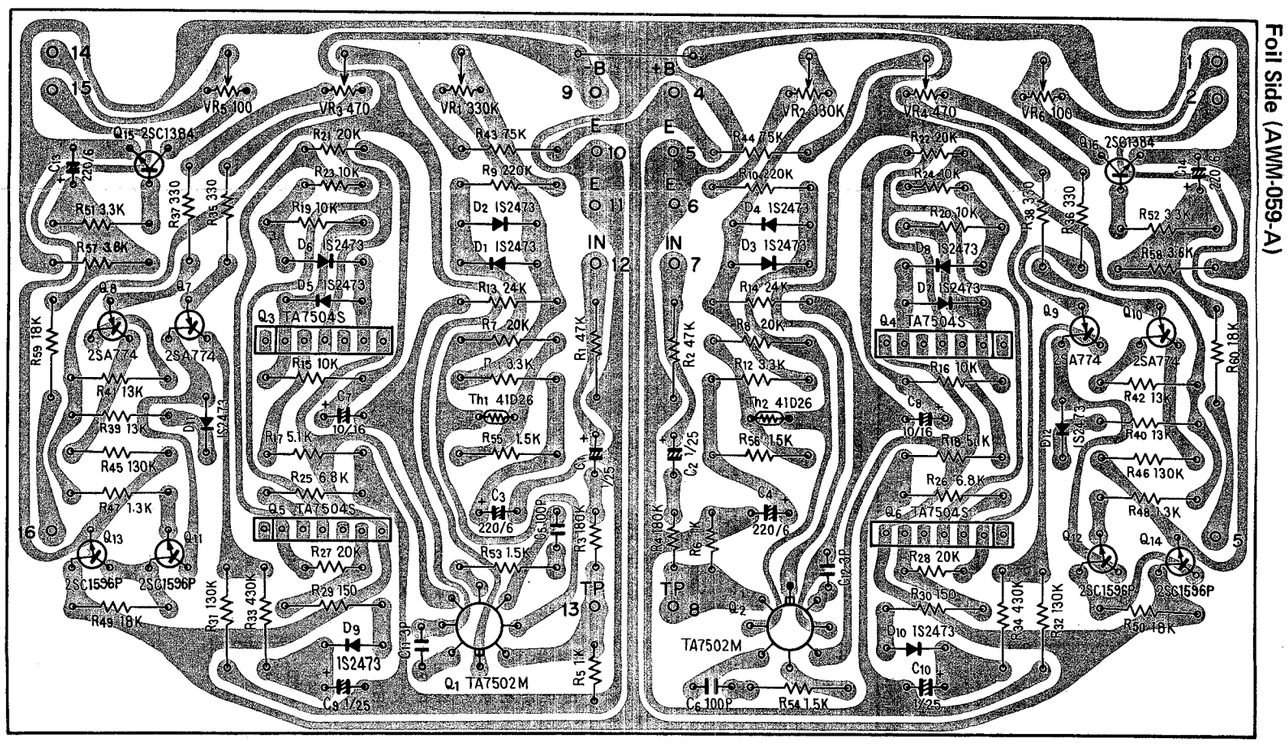
TA7504S



TA7502M



Foil Side (AWM-059-A)



Parts List of Meter Amplifier Assembly (AWM-059-A)

CAPACITORS

Symbol	Description			Part No.	
C1	Electrolytic	1	25V	CSZA 010M 25	
C2	Electrolytic	1	25V	CSZA 010M 25	
C3	Electrolytic	220	6V	CEA 221P 6	
C4	Electrolytic	220	6V	CEA 221P 6	
C5	Ceramic	100p	50V	CCDSL 101K 50	
C6	Ceramic	100p	50V	CCDSL 101K 50	
C7	Electrolytic	10	16V	CSZA 100M 16	
C8	Electrolytic	10	16V	CSZA 100M 16	
C9	Electrolytic	1	25V	CSZA 010M 25	
C10	Electrolytic	1	25V	CSZA 010M 25	
C11	Ceramic	3p	50V	CCDSL 030C 50	
C12	Ceramic	3p	50V	CCDSL 030C 50	
C13	Electrolytic	220	6V	CEA 221P 6	
C14	Electrolytic	220	6V	CEA 221P 6	

RESISTORS

Symbol	Description		Part No.	
R1	Carbon film	47k	RD¼PS 473J	
R2	Carbon film	47k	RD¼PS 473J	
R3	Metal film	180k	RN¼SS 1803F	
R4	Metal film	180k	RN¼SS 1803F	
R5	Metal film	1k	RN¼SR 1001F	
R6	Metal film	1k	RN¼SR 1001F	
R7	Carbon film	20k	RD¼PS 203J	
R8	Carbon film	20k	RD¼PS 203J	
R9	Carbon film	220k	RD¼PS 224J	
R10	Carbon film	220k	RD¼PS 224J	
R11	Carbon film	3.3k	RD¼PS 332J	
R12	Carbon film	3.3k	RD¼PS 332J	
R13	Carbon film	24k	RD¼PS 243J	
R14	Carbon film	24k	RD¼PS 243J	
R15	Carbon film	10k	RD¼PS 103J	
R16	Carbon film	10k	RD¼PS 103J	
R17	Carbon film	5.1k	RD¼PS 512J	
R18	Carbon film	5.1k	RD¼PS 512J	
R19	Carbon film	10k	RD¼PS 103J	
R20	Carbon film	10k	RD¼PS 103J	
R21	Metal film	20k	RN¼SR 2002F	
R22	Metal film	20k	RN¼SR 2002F	
R23	Metal film	10k	RN¼SR 1002F	
R24	Metal film	10k	RN¼SR 1002F	
R25	Carbon film	6.8k	RD¼PS 682J	
R26	Carbon film	6.8k	RD¼PS 682J	
R27	Metal film	20k	RN¼SR 2002F	
R28	Metal film	20k	RN¼SR 2002F	
R29	Carbon film	150	RD¼PS 151J	
R30	Carbon film	150	RD¼PS 151J	

Symbol	Description	Part No.	
R31	Carbon film 130k	RD¼PS 134J	
R32	Carbon film 130k	RD¼PS 134J	
R33	Carbon film 430k	RD¼PS 434J	
R34	Carbon film 430k	RD¼PS 434J	
R35	Carbon film 330	RD¼PS 331J	
R36	Carbon film 330	RD¼PS 331J	
R37	Carbon film 330	RD¼PS 331J	
R38	Carbon film 330	RD¼PS 331J	
R39	Carbon film 13k	RD¼PS 133J	
R40	Carbon film 13k	RD¼PS 133J	
R41	Carbon film 13k	RD¼PS 133J	
R42	Carbon film 13k	RD¼PS 133J	
R43	Carbon film 75k	RD¼PS 753J	
R44	Carbon film 75k	RD¼PS 753J	
R45	Carbon film 130k	RD¼PS 134J	
R46	Carbon film 130k	RD¼PS 134J	
R47	Carbon film 1.3k	RD¼PS 132J	
R48	Carbon film 1.3k	RD¼PS 132J	
R49	Carbon film 18k	RD¼PS 183J	
R50	Carbon film 18k	RD¼PS 183J	
R51	Carbon film 3.3k	RD¼PS 322J	
R52	Carbon film 3.3k	RD¼PS 332J	
R53	Carbon film 1.5k	RD¼PS 152J	
R54	Carbon film 1.5k	RD¼PS 152J	
R55	Carbon film 1.5k	RD¼PS 152J	
R56	Carbon film 1.5k	RD¼PS 152J	
R57	Carbon film 3.6k	RD¼PS 362J	
R58	Carbon film 3.6k	RD¼PS 362J	
R59	Carbon film 18k	RD¼PS 183J	
R60	Carbon film 18k	RD¼PS 183J	

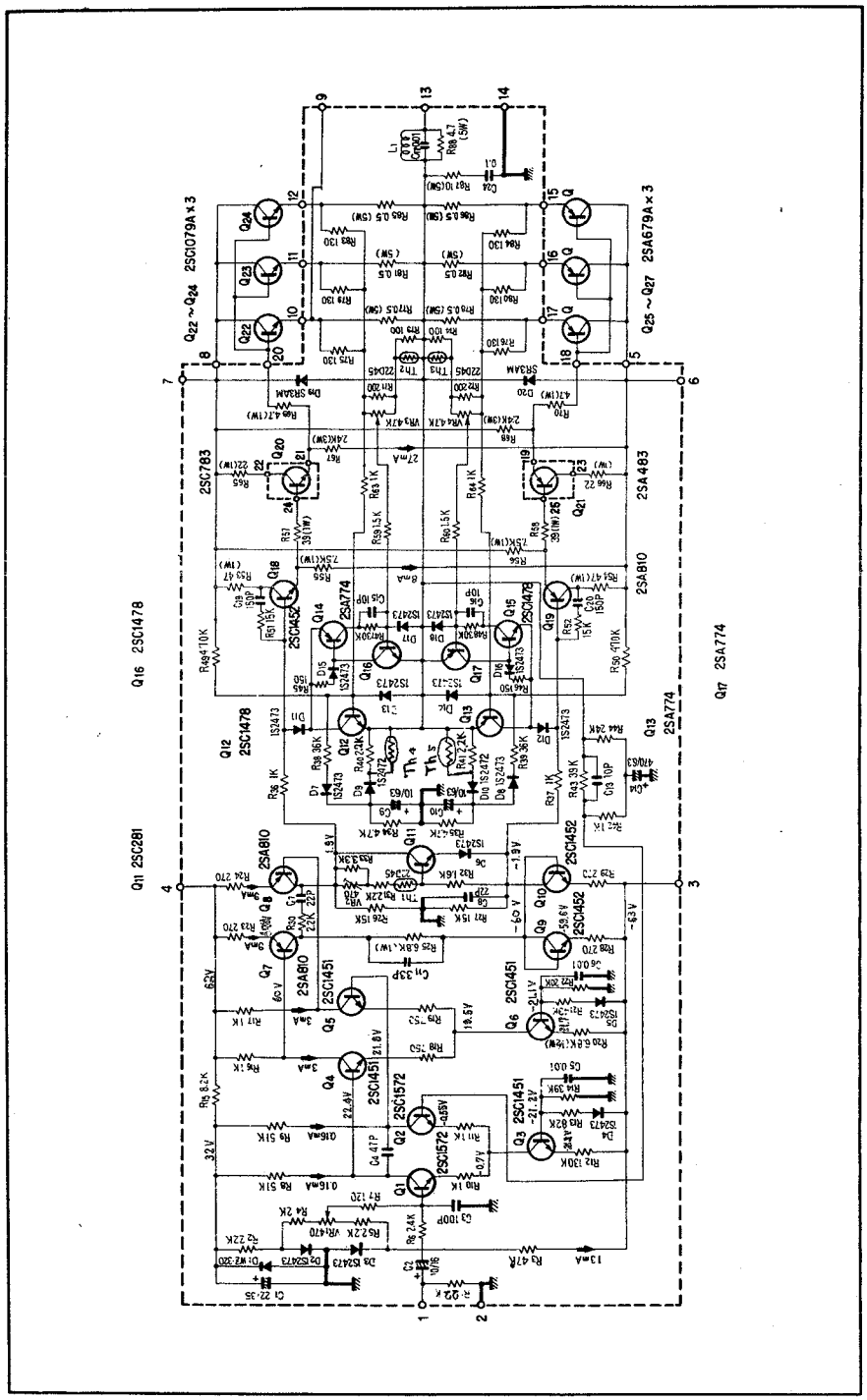
POTENTIOMETERS

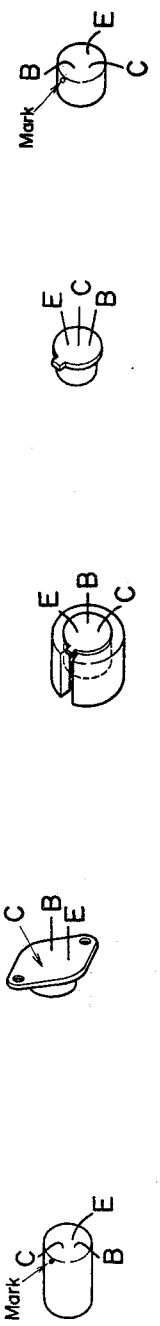
Symbol	Description	Part No.	
VR1	Semi-fixed variable resistor 330k-B	ACP-035-0	
VR2	Semi-fixed variable resistor 330k-B	ACP-035-0	
VR3	Semi-fixed variable resistor 470-B	ACP-033-0	
VR4	Semi-fixed variable resistor 470-B	ACP-033-0	
VR5	Semi-fixed variable resistor 100-B	ACP-032-0	
VR6	Semi-fixed variable resistor 100-B	ACP-032-0	

SEMICONDUCTORS

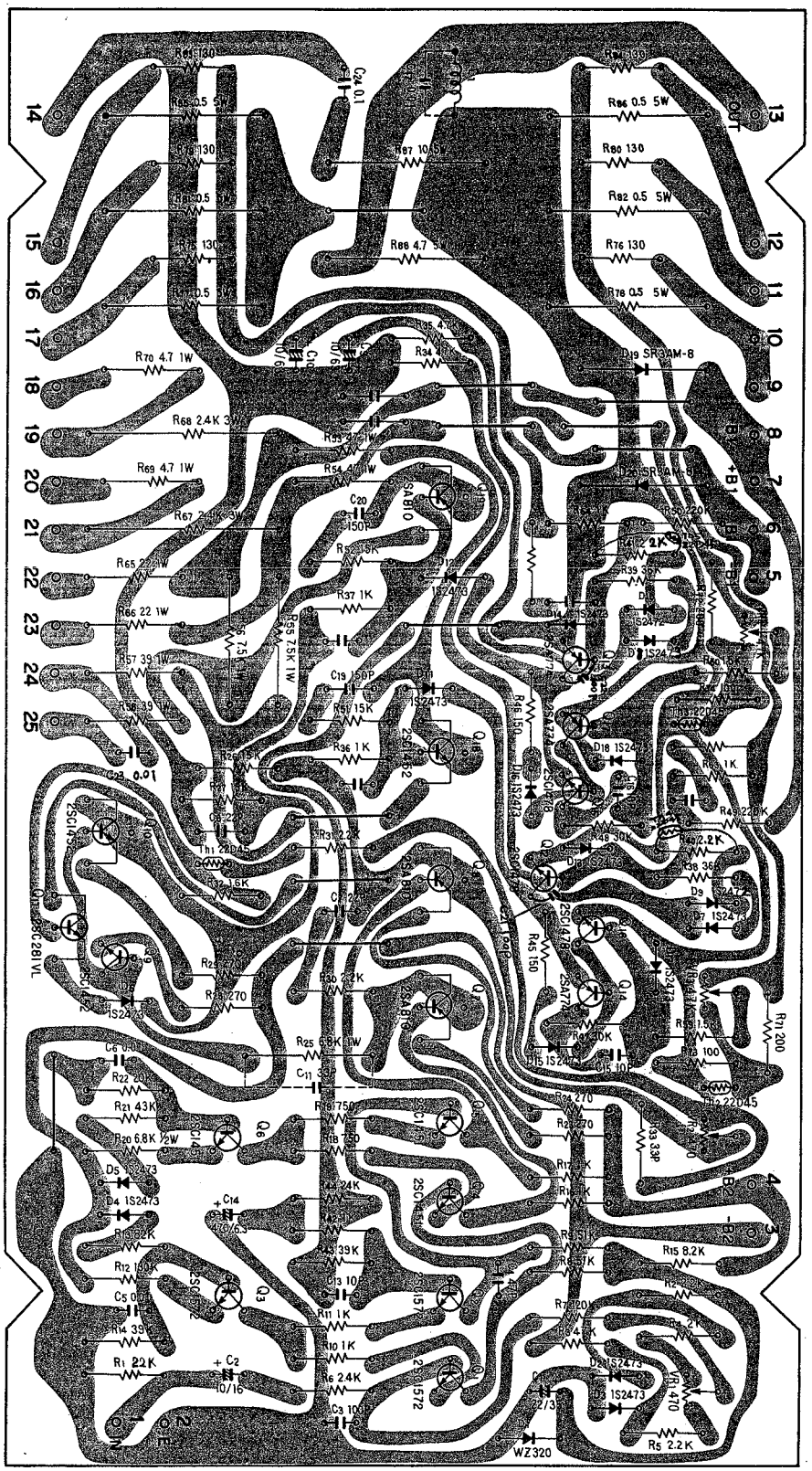
Symbol	Description		Part No.	
Q1	IC	TA7502M		
Q2	IC	TA7502M		
Q3	IC	TA7504S		
Q4	IC	TA7504S		
Q5	IC	TA7504S		
Q6	IC	TA7504S		
Q7	Transistor	2SA774-U		
Q8	Transistor	2SA774-U		
Q9	Transistor	2SA774-U		
Q10	Transistor	2SA774-U		
Q11	Transistor	2SC1596P-B, G(2SC1344-E)		
Q12	Transistor	2SC1596P-B, G(2SC1344-E)		
Q13	Transistor	2SC1596P-B, G(2SC1344-E)		
Q14	Transistor	2SC1596P-B, G(2SC1344-E)		
Q15	Transistor	2SC1384-R		
Q16	Transistor	2SC1384-R		
D1	Diode	1S2473		
D2	Diode	1S2473		
D3	Diode	1S2473		
D4	Diode	1S2473		
D5	Diode	1S2473		
D6	Diode	1S2473		
D7	Diode	1S2473		
D8	Diode	1S2473		
D9	Diode	1S2473		
D10	Diode	1S2473		
D11	Diode	1S2473		
D12	Diode	1S2473		
Th1	Thermistor	41D26		
Th2	Thermistor	41D26		

11.5 POWER AMPLIFIER ASSEMBLY (AWH-029-0)





Foil Side (AWH-029-0)



Parts List of Power Amplifier Assembly (AWH-029-0)

CAPACITORS

Symbol	Description			Part No.	
C1	Electrolytic	22	35V	CEA 220P 35-85C	
C2	Electrolytic	10	16V	CSZA 100M 16	
C3	Ceramic	100p	50V	CCDSL 101K 50	
C4	Ceramic	47p	50V	CCDSL 470K 50	
C5	Mylar	0.01	50V	CQMA 103K 50R	
C6	Mylar	0.01	50V	CQMA 103K 50R	
C7	Ceramic	22p	50V	CCDSL 220K 50	
C8	Ceramic	22p	50V	CCDSL 220K 50	
C9	Electrolytic	10	63V	CEA 100P 63-85C	
C10	Electrolytic	10	63V	CEA 100P 63-85C	
C11	Ceramic	33p	50V	CCDSL 330K 50	
C12					
C13	Ceramic	10p	50V	CCDSL 100K 50	
C14	Electrolytic	470	6V	CEA 471P 6-85C	
C15	Ceramic	10p	50V	CCDSL 100K 50	
C16	Ceramic	10p	50V	CCDSL 100K 50	
C17	Ceramic	0.01	150V	ACG-004-0	
C18					
C19	Ceramic	150p	50V	CCDSL 151K 50	
C20	Ceramic	150p	50V	CCDSL 151K 50	
C21	Ceramic	100p	50V	CCDSL 101K 50	
C22	Ceramic	100p	50V	CCDSL 101K 50	
C23	Mylar	0.01	50V	COMA 103K 50R	
C24	Mylar	0.1	50V	CQMA 104K 50R	

RESISTORS AND POTENTIOMETERS

Symbol	Description			Part No.	
R1	Carbon film	22k		RD¼PS 223JNL	
R2	Carbon film	22k		RD¼PS 223JNL	
R3	Carbon film	47k		RD¼PS 473JNL	
R4	Carbon film	2k		RD¼PS 202JNL	
R5	Carbon film	2.2k		RD¼PS 222JNL	
R6	Carbon film	2.4k		RD¼PS 242JNL	
R7	Carbon film	120k		RD¼PS 124JNL	
R8	Carbon film	51k		RD¼PS 513JNL	
R9	Carbon film	51k		RD¼PS 513JNL	
R10	Carbon film	1k		RD¼PS 102JNL	
R11	Carbon film	1k		RD¼PS 102JNL	
R12	Carbon film	130k		RD¼PS 134JNL	
R13	Carbon film	82k		RD¼PS 823JNL	
R14	Carbon film	39k		RD¼PS 393JNL	
R15	Carbon film	8.2k		RD¼PS 822JNL	
R16	Carbon film	1k		RD¼PS 102JNL	
R17	Carbon film	1k		RD¼PS 102JNL	
R18	Carbon film	750		RD¼PS 751JNL	
R19	Carbon film	750		RD¼PS 751JNL	
R20	Carbon film	6.8k	½W	RD½PS 682J	

Symbol	Description			Part No.	
R21	Carbon film	43k		RD¼PS 433J	
R22	Carbon film	20k		RD¼PS 203J	
R23	Carbon film	270		RD¼PS 271J	
R24	Carbon film	270		RD¼PS 271J	
R25	Metal oxide	6.8k	1W	RS1PF 682J	
R26	Carbon film	15k		RD¼PS 153J	
R27	Carbon film	15k		RD¼PS 153J	
R28	Carbon film	270		RD¼PS 271J	
R29	Carbon film	270		RD¼PS 271J	
R30	Carbon film	2.2k.		RD¼PS 222J	
R31	Carbon film	2.2k		RD¼PS 222J	
R32	Carbon film	1.6k		RD¼PS 162J	
R33	Carbon film	3.3k		RD¼PS 332J	
R34	Carbon film	4.7k		RD¼PS 472J	
R35	Carbon film	4.7k		RD¼PS 472J	
R36	Carbon film	1k		RD¼PS 102J	
R37	Carbon film	1k		RD¼PS 102J	
R38	Carbon film	36k		RD¼PS 363J	
R39	Carbon film	36k		RD¼PS 363J	
R40	Carbon film	2.2k		RD¼PS 222J	
R41	Carbon film	2.2k		RD¼PS 222J	
R42	Carbon film	1k		RD¼PS 102JNL	
R43	Carbon film	39k		RD¼PS 393JNL	
R44	Carbon film	24k		RD¼PS 243JNL	
R45	Carbon film	150		RD¼PS 151J	
R46	Carbon film	150		RD¼PS 151J	
R47	Carbon film	30k		RD¼PS 303J	
R48	Carbon film	30k		RD¼PS 303J	
R49	Carbon film	470k		RD¼PS 474J	
R50	Carbon film	470k		RD¼PS 474J	
R51	Carbon film	15k		RD¼PS 153J	
R52	Carbon film	15k		RD¼PS 153J	
R53	Metal oxide	47	1W	RS1PF 470J	
R54	Metal oxide	47	1W	RS1PF 470J	
R55	Metal oxide	7.5k	1W	RS1PF 752J	
R56	Metal oxide	7.5k	1W	RS1PF 752J	
R57	Metal oxide	39	1W	RS1PF 390J	
R58	Metal oxide	39	1W	RS1PF 390J	
R59	Carbon film	1.5k		RD¼PS 152J	
R60	Carbon film	1.5k		RD¼PS 152J	
R61					
R62					
R63	Carbon film	1k		RD¼PS 102J	
R64	Carbon film	1k		RD¼PS 102J	
R65	Metal oxile	22	1W	RS1PF 220J	
R66	Metal oxide	22	1W	RS1PF 220J	
R67	Metal oxide	2.4k	3W	RS3PF 242J	
R68	Metal oxide	2.4k	3W	RS3PF 242J	
R69	Metal film	4.7	1W	RN1H 4R7K	
R70	Metal film	4.7	1W	RN1H 4R7K	

Symbol	Description			Part No.	
R71	Carbon film	200		RD¼PS 201J	
R72	Carbon film	200		RD¼PS 201J	
R73	Carbon film	100		RD¼PS 101J	
R74	Carbon film	100		RD¼PS 101J	
R75	Carbon film	130		RD¼PS 131J	
R76	Carbon film	130		RD¼PS 131J	
R77	Wire wound	0.5	5W	RT5B 0R5K	
R78	Wire wound	0.5	5W	RT5B 0R5K	
R79	Carbon film	130		RD¼PS 131J	
R80	Carbon film	130		RD¼PS 131J	
R81	Wire wound	0.5	5W	RT5B 0R5K	
R82	Wire wound	0.5	5W	RT5B 0R5K	
R83	Carbon film	130		RD¼PS 131J	
R84	Carbon film	130		RD¼PS 131J	
R85	Wire wound	0.5	5W	RT5B 0R5K	
R86	Wire wound	0.5	5W	RT5B 0R5K	
R87	Wire wound	10	5W	RT5B 100K	
R88	Wire wound	4.7	5W	RT5B 4R7K	
VR1	Semi-fixed variable resistor	470-B		ACP-033-0	
VR2	Semi-fixed variable resistor	470-B		ACP-033-0	
VR3	Semi-fixed variable resistor	4.7k-B		ACP-034-0	
VR4	Semi-fixed variable resistor	4.7k-B		ACP-034-0	

SEMICONDUCTORS

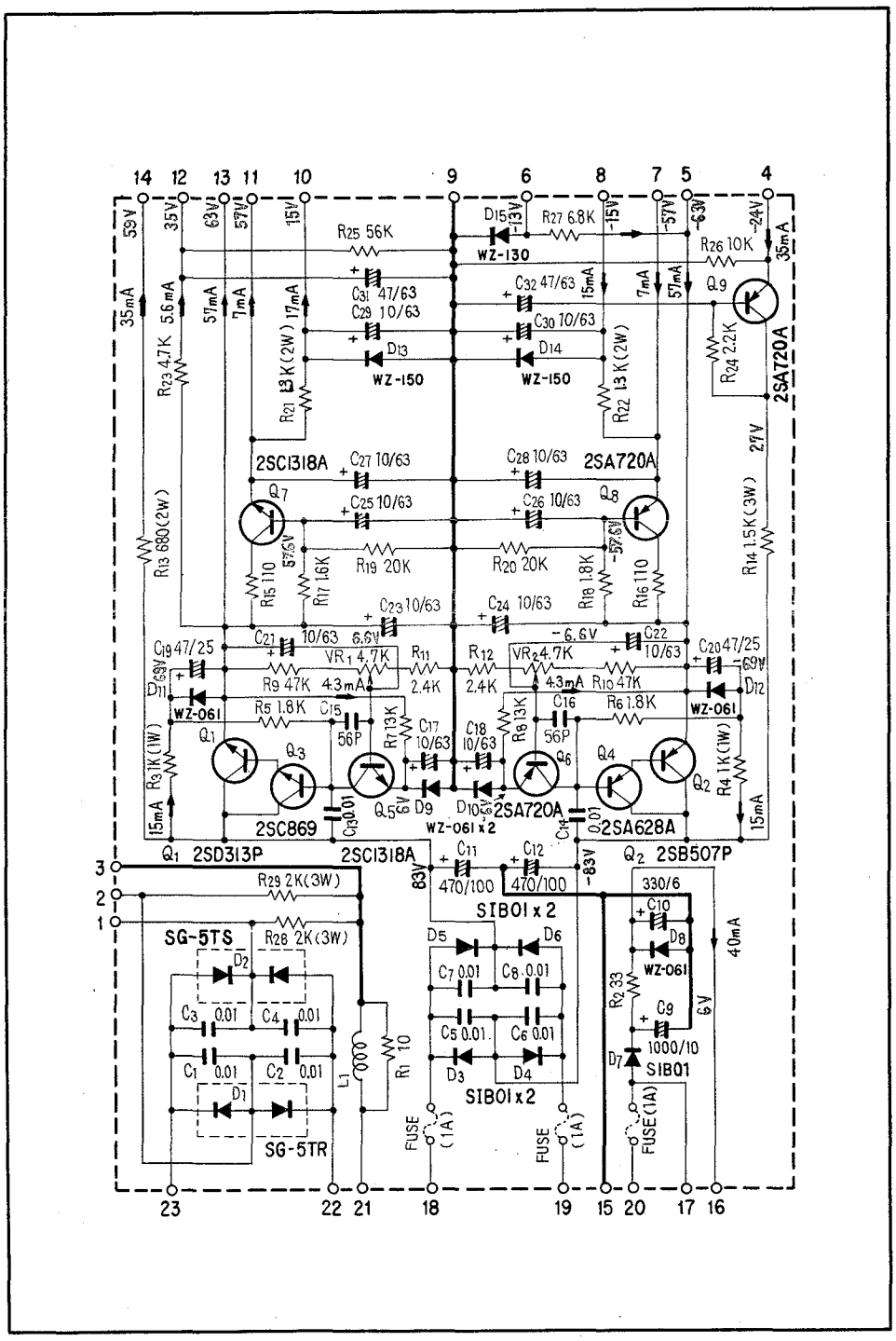
Symbol	Description		Part No.	
Q1	Transistor	2SC1572-H, or G		
Q2	Transistor	2SC1572-H or G		
Q3	Transistor	2SC1572-H or G		
Q4	Transistor	2SC1451-B, G or V		
Q5	Transistor	2SC1451-B, G or V		
Q6	Transistor	2SC1451-B, G or V		
Q7	Transistor	2SA810-B, G or V		
Q8	Transistor	2SA810-B, G or V		
Q9	Transistor	2SC1452-B, G or V		
Q10	Transistor	2SC1452-B, G or V		
Q11	Transistor	2SC281VL-B or C		
Q12	Transistor	2SC1478-T		
Q13	Transistor	2SA774-T		
Q14	Transistor	2SA774-T		
Q15	Transistor	2SC1478-T		
Q16	Transistor	2SC1478-T		
Q17	Transistor	2SA774-T		
Q18	Transistor	2SC1452-B, G or V		
Q19	Transistor	2SA810-B, G or V		
Q20	Transistor	2SC783-R, or O		

Symbol	Description		Part No.	
Q21	Transistor	2SA483-R or O		
Q22	Transistor	2SC1079A-Y		
Q23	Transistor	2SC1079A-Y		
Q24	Transistor	2SC1079A-Y		
Q25	Transistor	2SA679A-Y		
Q26	Transistor	2SA679A-Y		
Q27	Transistor	2SA679A-Y		
D1	Zener diode	WZ-320		
D2	Diode	1S2473		
D3	Diode	1S2473		
D4	Diode	1S2473		
D5	Diode	1S2473		
D6	Diode	1S2473		
D7	Diode	1S2473		
D8	Diode	1S2473		
D9	Diode	1S2472		
D10	Diode	1S2472		
D11	Diode	1S2473		
D12	Diode	1S2473		
D13	Diode	1S2473		
D14	Diode	1S2473		
D15	Diode	1S2473		
D16	Diode	1S2473		
D17	Diode	1S2473		
D18	Diode	1S2473		
D19	Diode	SR3AM-8		
D20	Diode	SR3AM-8		
Th1	Thermistor	22D45		
Th2	Thermistor	22D45		
Th3	Thermistor	22D45		
Th4	Thermistor	22D45		
Th5	Thermistor	22D45		

OTHERS

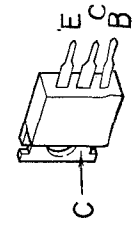
Symbol	Description	Part No.	
	Comb-line socket	AKF-018-0	
	Heat sink	ANH-183-0	
	Power transistor socket	AKH-001-0	
	Power transistor socket	AKH-003-0	
L1	AF choke coil	T63-009-0	
	1P mini housing	AEC-131-0	
	Spacer (insulator)	AEC-076-0	
	Spacer (insulator)	AEC-077-0	

11.6 POWER SUPPLY CIRCUIT ASSEMBLY (AWR-050-B)

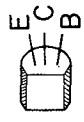


2SA720A
2SC628A
2SC1318A

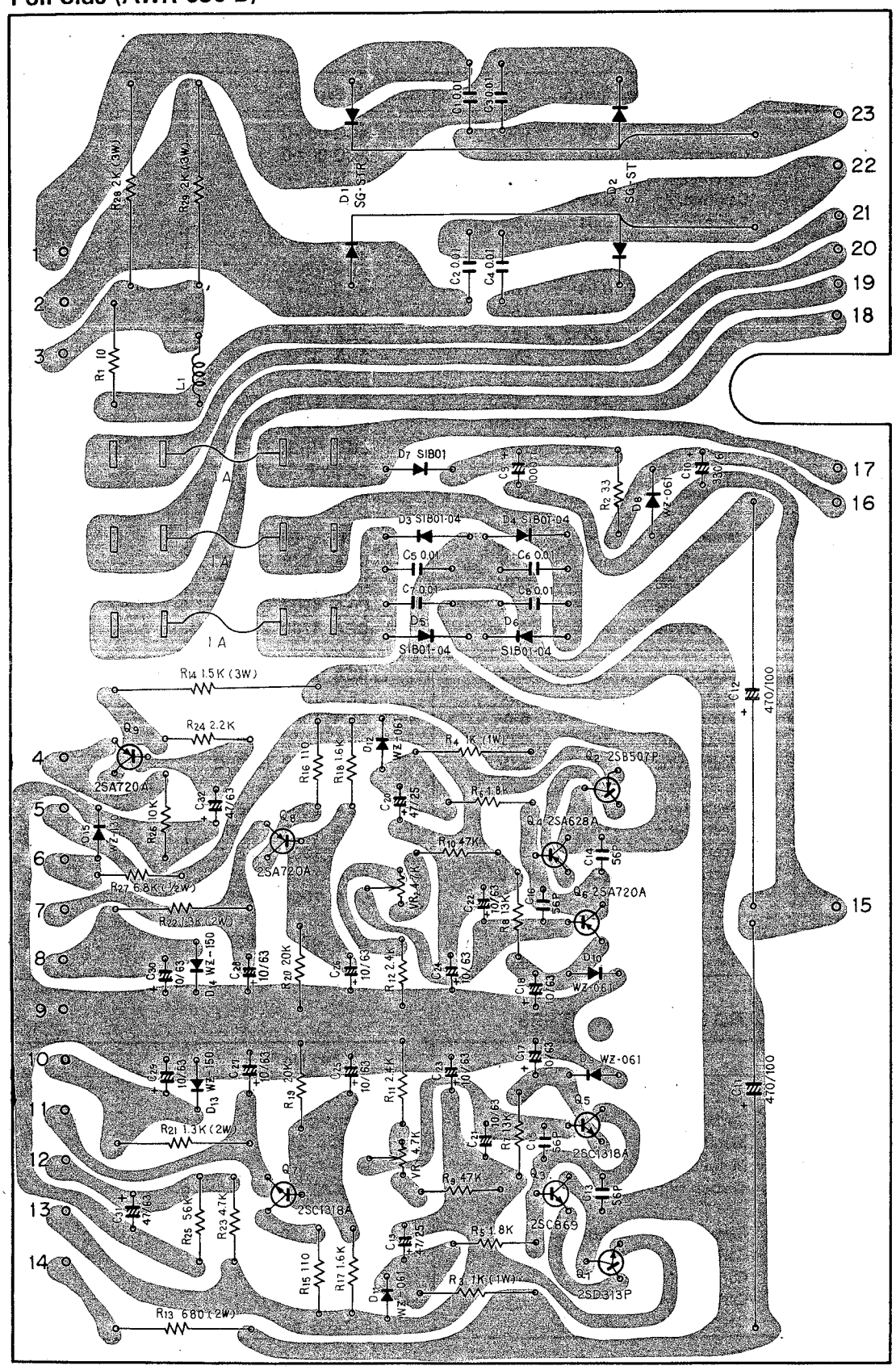
2SB507P
2SD313P



2SC869



Foil Side (AWR-050-B)



Parts List of Power Supply Circuit Assembly (AWR-050-B)

CAPACITORS

Symbol	Description			Part No.	
C1	Ceramic	0.01	150V	ACG-004-0	
C2	Ceramic	0.01	150V	ACG-004-0	
C3	Ceramic	0.01	150V	ACG-004-0	
C4	Ceramic	0.01	150V	ACG-004-0	
C5	Ceramic	0.01	150V	ACG-004-0	
C6	Ceramic	0.01	150V	ACG-004-0	
C7	Ceramic	0.01	150V	ACG-004-0	
C8	Ceramic	0.01	150V	ACG-004-0	
C9	Electrolytic	1,000	10V	CEA 102P 10-85C	
C10	Electrolytic	330	6V	CEA 331P 6-85C	
C11	Electrolytic	470	100V	CEB 471P 100	
C12	Electrolytic	470	100V	CEB 471P 100	
C13	Ceramic	0.01	50V	CKDYF 103Z 50	
C14	Ceramic	0.01	50V	CKDYF 103Z 50	
C15	Ceramic	56p	50V	CCDSL 560K 50	
C16	Ceramic	56p	50V	CCDSL 560K 50	
C17	Electrolytic	10	63V	CEA 100P 63-85C	
C18	Electrolytic	10	63V	CEA 100P 63-85C	
C19	Electrolytic	47	25V	CEA 470P 25-85C	
C20	Electrolytic	47	25V	CEA 470P 25-85C	
C21	Electrolytic	10	63V	CEA 100P 63-85C	
C22	Electrolytic	10	63V	CEA 100P 63-85C	
C23	Electrolytic	10	63V	CEA 100P 63-85C	
C24	Electrolytic	10	63V	CEA 100P 63-85C	
C25	Electrolytic	10	63V	CEA 100P 63-85C	
C26	Electrolytic	10	63V	CEA 100P 63-85C	
C27	Electrolytic	10	63V	CEA 100P 63-85C	
C28	Electrolytic	10	63V	CEA 100P 63-85C	
C29	Electrolytic	10	63V	CEA 100P 63-85C	
C30	Electrolytic	10	63V	CEA 100P 63-85C	
C31	Electrolytic	47	63V	CEA 470P 63-85C	
C32	Electrolytic	47	63V	CEA 470P 63-85C	

RESISTORS AND POTENTIOMETERS

Symbol	Description			Part No.	
R1	Carbon film	10	½W	RD½PS 100J	
R2	Carbon film	33		RD¼PS 330J	
R3	Metal oxide	1k	1W	RS1PF 102J	
R4	Metal oxide	1k	1W	RS1PF 102J	
R5	Carbon film	1.8k		RD¼PS 182J	
R6	Carbon film	1.8k		RD¼PS 182J	
R7	Carbon film	13k		RD¼PS 133J	
R8	Carbon film	13k		RD¼PS 133J	
R9	Carbon film	47k		RD¼PS 473J	
R10	Carbon film	47k		RD¼PS 473J	

Symbol	Description			Part No.	
R11	Carbon film	2.4k		RD¼PS 242J	
R12	Carbon film	2.4k		RD¼PS 242J	
R13	Metal oxide	680	2W	RS2PF 681J	
R14	Metal oxide	1.5k	3W	RS3PF 152J	
R15	Carbon film	110		RD¼PS 111J	
R16	Carbon film	110		RD¼PS 111J	
R17	Carbon film	1.6k		RD¼PS 162J	
R18	Carbon film	1.8k		RD¼PS 182J	
R19	Carbon film	20k		RD¼PS 203J	
R20	Carbon film	20k		RD¼PS 203J	
R21	Metal oxide	1.3k	2W	RS2PF 132J	
R22	Metal oxide	1.3k	2W	RS2PF 132J	
R23	Carbon film	4.7k		RD¼PS 472J	
R24	Carbon film	2.2k		RD¼PS 222J	
R25	Carbon film	56k		RD¼PS 563J	
R26	Carbon film	10k		RD¼PS 103J	
R27	Carbon film	6.8k	½W	RD½PS 682J	
R28	Metal oxide	2k	3W	RS3PF 202J	
R29	Metal oxide	2k	3W	RS3PF 202J	
VR1	Semi-fixed variable resistor	4.7k-B		ACP-034-0	
VR2	Semi-fixed variable resistor	4.7k-B		ACP-034-0	

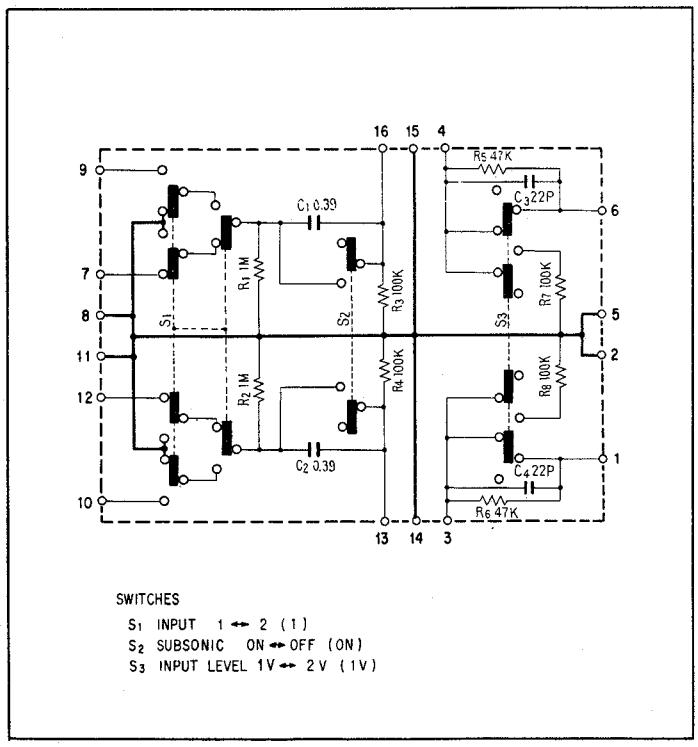
SEMICONDUCTORS

Symbol	Description		Part No.	
Q1	Transistor	2SD313P-E		
Q2	Transistor	2SB507P-E		
Q3	Transistor	2SC869-C		
Q4	Transistor	2SA628A-C		
Q5	Transistor	2SC1318A-R		
Q6	Transistor	2SA720A-R		
Q7	Transistor	2SC1318A-R		
Q8	Transistor	2SA720A-R		
Q9	Transistor	2SA720A-R		
D1	Diode	SG-5TR		
D2	Diode	SG-5TS		
D3	Diode	SI B01-04		
D4	Diode	SI B01-04		
D5	Diode	SI B01-04		
D6	Diode	SI B01-04		
D7	Diode	SI B01-04		
D8	Zener diode	WZ-061		
D9	Zener diode	WZ-061		
D10	Zener diode	WZ-061		
D11	Zener diode	WZ-061		
D12	Zener diode	WZ-061		
D13	Zener diode	WZ-150		
D14	Zener diode	WZ-150		
D15	Zener diode	WZ-130		

OTHERS

Symbol	Description	Part No.	
	Fuse holder (clip in type)	K91-006-0	
	Choke coil	ATH-006-0	
	Insulator spacer	AEC-076-0	
	Insulator bush	E32-047-0	
	Insulator spacer	AEC-078-0	
	Radiator holder	ANG-046-0	
	Molded transistor socket	AKH-002-0	
	Heat sink	ANH-189-0	

11.7 SWITCH CIRCUIT-A ASSEMBLY (AWS-062-0)



Power supply circuit assembly

CAPACITORS

Symbol	Description	Part No.	
C1	Metallized mylar 0.39 50V	CQEA 394K 50	
C2	Metallized mylar 0.39 50V	CQEA 394K 50	
C3	Ceramic 22p 50V	CCDSL 220K 50	
C4	Ceramic 22p 50V	CCDSL 220K 50	

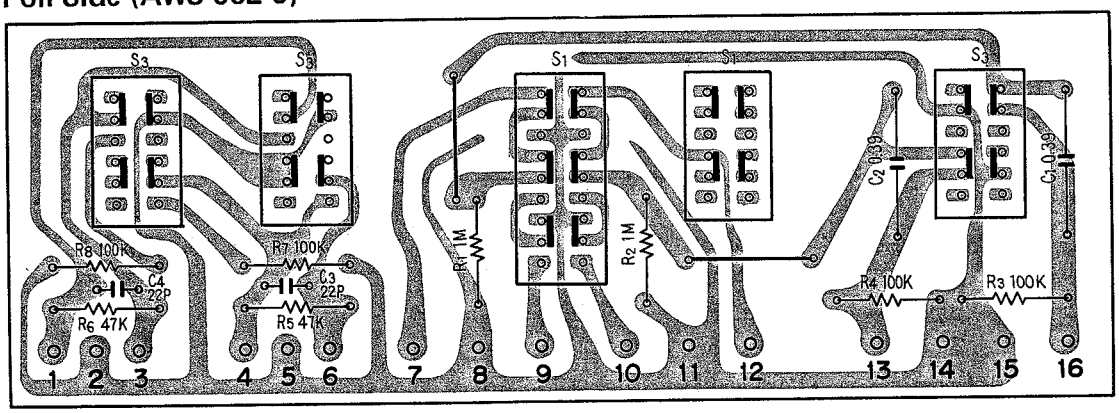
RESISTORS

Symbol	Description	Part No.	
R1	Carbon film 1M	RD¼PS 105JNL	
R2	Carbon film 1M	RD¼PS 105JNL	
R3	Carbon film 100k	RD¼PS 104JNL	
R4	Carbon film 100k	RD¼PS 104JNL	
R5	Carbon film 47k	RD¼PS 473JNL	
R6	Carbon film 47k	RD¼PS 473JNL	
R7	Carbon film 100k	RD¼PS 104JNL	
R8	Carbon film 100k	RD¼PS 104JNL	

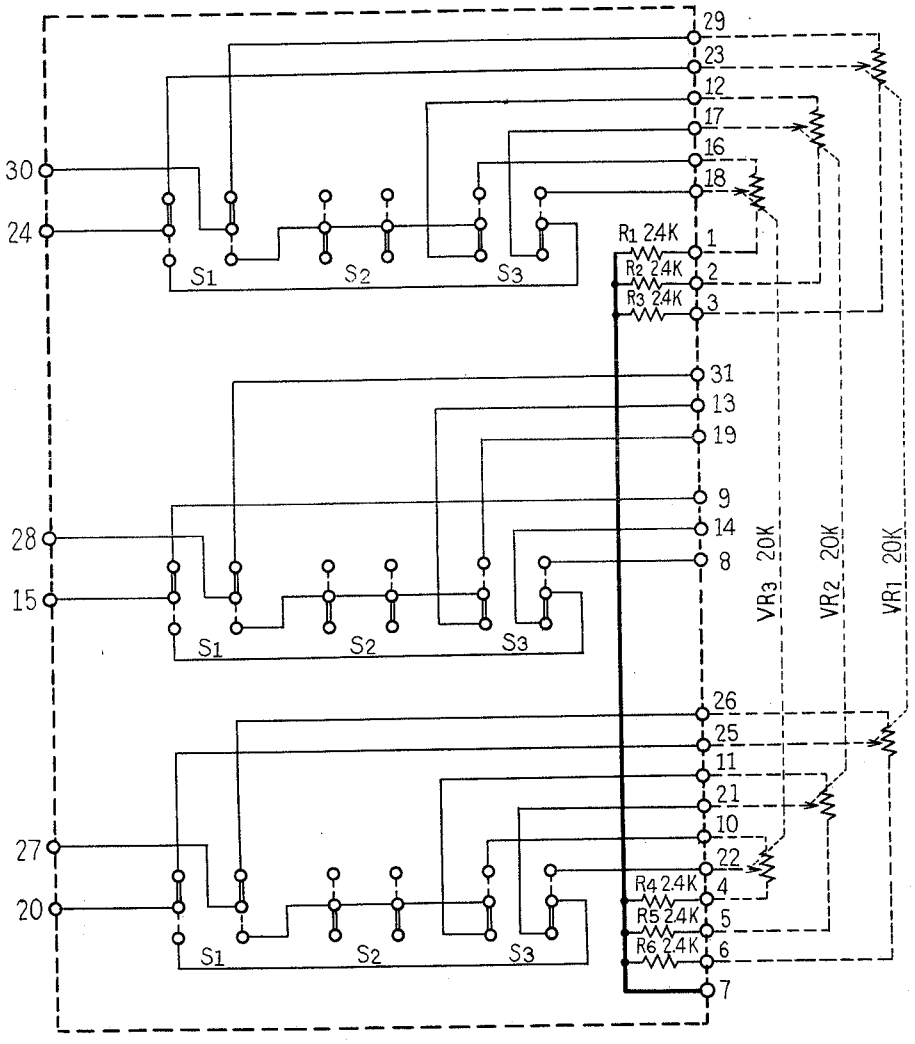
SWITCHES

Symbol	Description	Part No.	
S1	Push switch (input)	ASG-059-0	
S2	Push switch (subsonic)	ASG-056-0	
S3	Push switch (input level)	ASG-052-0	

Foil Side (AWS-062-0)



11.8 SWITCH CIRCUIT-B ASSEMBLY (AWS-081-0)



SWITCHES

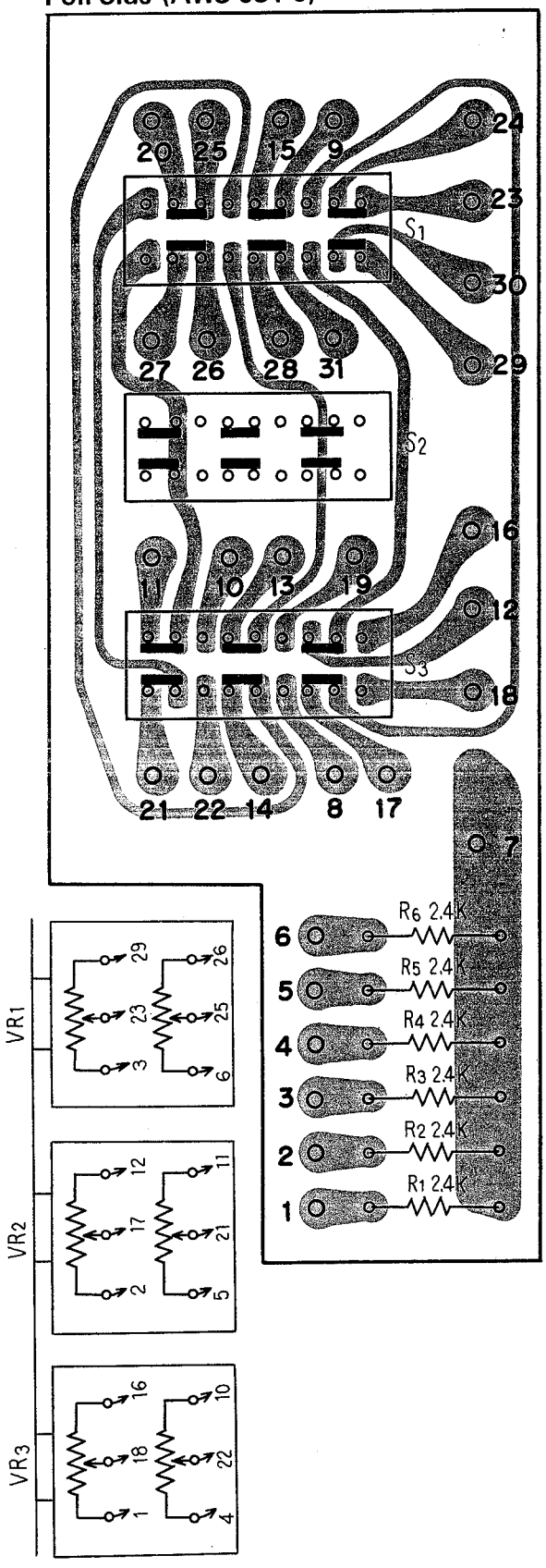
S_1 : SPEAKER-A (ON)

S_2 : 〃 -B (OFF)

S_3 : 〃 -C (OFF)

VR(1.2.3) : SPEAKER LEVEL CONTROL (A.B.C.)

Foil Side (AWS-081-0)



Parts List of Switch Circuit-B Assembly (AWS-081-0)

RESISTORS AND POTENTIOMETERS

Symbol	Description	Part No.	
R1	Carbon film 2.4k	RD¼PS 242JNL	
R2	Carbon film 2.4k	RD¼PS 242JNL	
R3	Carbon film 2.4k	RD¼PS 242JNL	
R4	Carbon film 2.4k	RD¼PS 242JNL	
R5	Carbon film 2.4k	RD¼PS 242JNL	
R6	Carbon film 2.4k	RD¼PS 242JNL	
VR1	Variable resistor, dual 20k-A(speaker A)	ACT-112-0	
VR2	Variable resistor, dual 20k-A(speaker B)	ACT-112-0	
VR3	Variable resistor, dual 20k-A(speaker C)	ACT-112-0	

SWITCHES

Symbol	Description	Part No.	
S1	Push switch (speakers)	ASG-057-0	

PIONEER

EXCLUSIVE M3

N

BUFFER-AMP ASS'y AWM-057

SWITCH ASS'y (A)
AWS-062

SWITCH ASS'y (B)
AWS-081 ½

SWITCH ASS'y (B)
AWS-081 ²/₂

SPEAKER IND. LAMP
8V 50mA x3

METER AMP ASS'y AWM-059

PEAK LEVEL METER
LEFT

PEAK LEVEL METER
RIGHT

POWER SUPPLY CIRCUIT
ASS'y AWR-050

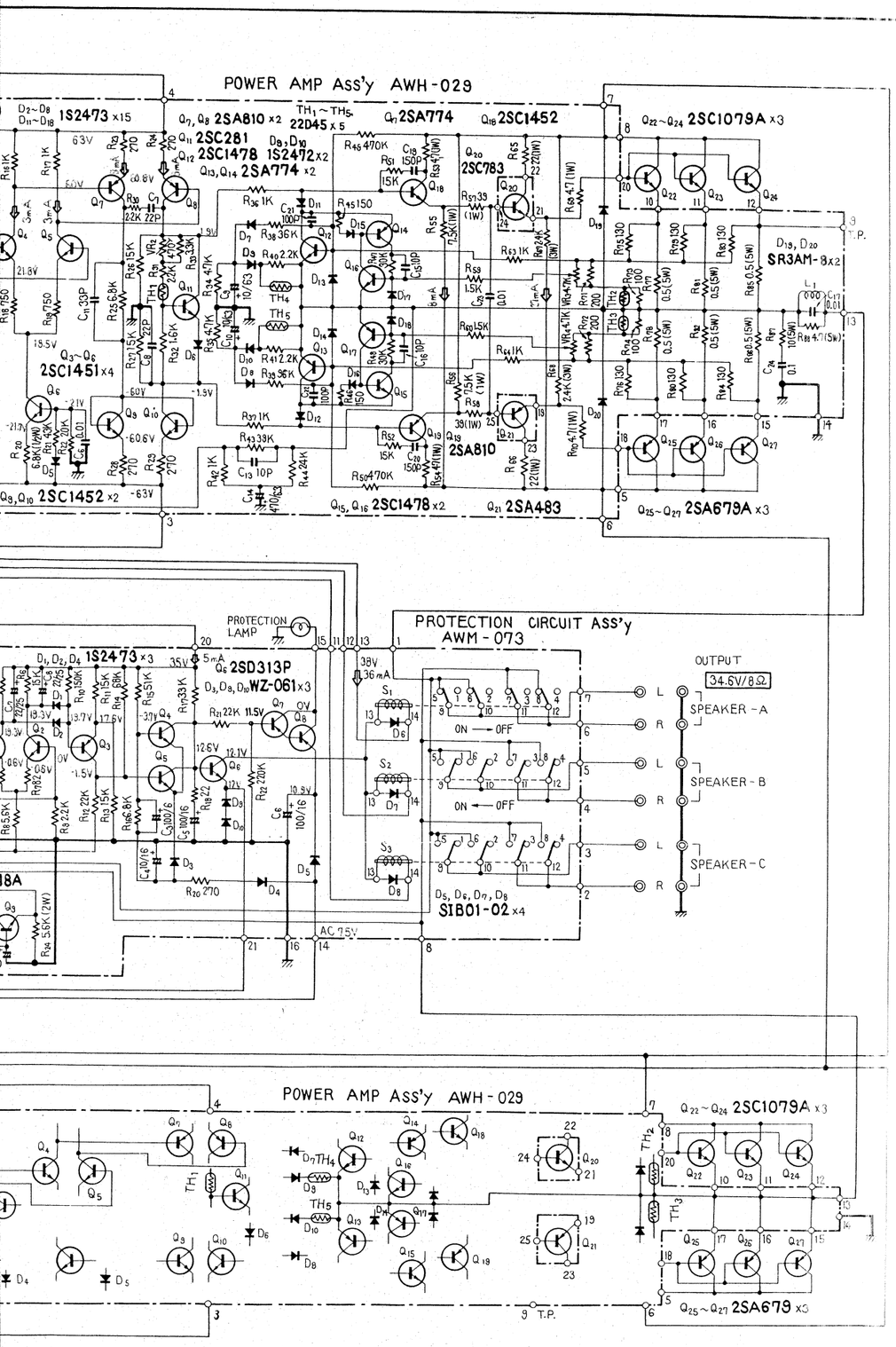
* Fuse will blow out at F228* (C109*)

SWITCHES
S1 : POWER
S2 : RELAY

(SWITCH Ass'y A
S1 : INPUT
S2 : SUBSONI
S3 : INPUT L

(SWITCH Ass'y B)
S1 : SPEAKE
S2 : SPEAKE
S3 : SPEAKE

POTENTIOMETER
VR1 SPEAK
VR2 SPEAK
VR3 SPEAK



NOTES

- V : SIGNAL VOLTAGE NECESSARY FOR OBTAINING 150W/8Ω OUTPUT POWER (1kHz).
- V : DC VOLTAGE AT NO INPUT SIGNAL.
- ⇦ A : DC CURRENT AT NO INPUT SIGNAL.
- (V) : DC VOLTAGE AT 150W/8Ω OUTPUT POWER.
- (A) : DC CURRENT AT 150W/8Ω OUTPUT POWER.

RESISTORS

IN OHM, 1/4W, ±5% TOLERANCE UNLESS OTHERWISE NOTED.
K : kΩ M : MΩ

CAPACITORS

IN μF UNLESS OTHERWISE NOTED.
P : pF

OWER ON ⟷ OFF
ELAY ON ⟷ OFF

's'y A)
PUT 1 ⟷ 2
BSONIC ON ⟷ OFF
PUT LEVEL 1V ⟷ 2V

's'y B)
PEAKER A ON ⟷ OFF
PEAKER B ON ⟷ OFF
PEAKER C ON ⟷ OFF

ETERS
PEAKER LEVEL A
PEAKER LEVEL B
PEAKER LEVEL C

12. PACKING METHOD AND PARTS NUMBERS